UNIVERSITY OF LJUBLJANA
**FACULTY OF SOCIAL SCIENCE**

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# An Influence of the External Knowledge to the Concept of Open Innovation in Slovenia and Germany

## Vpliv zunanjega znanja na koncept odprte inovacije v Sloveniji in Nemčiji

**Master Thesis**

**Ljubljana, 2015**

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**ZAHVALA**

*Hvala mentoru red. Prof. Dr. Ivanu Svetliku za nesebičnu podršku u završavanju zadatka. Hvala somentorici izr. Prof. Dr. Dani Mesner Andolšek što me je naučila kako se piše naučni rad. Bez moje dece Ane i Viktora i bez mog muža Gerasima ne bih uspela da ovo uradim, vi mi dajete snagu!*

*Thanks to my friend Heather Felsinger that she believes in me!*

## ABSTRACT

### An Influence of the External Knowledge to the Concept of Open Innovation in Slovenia and Germany

The basis of the innovation is knowledge. Innovation was defined as a use of knowledge. Universities are an important source of external knowledge for innovation in firms. I want to prove that external knowledge which has been placed in the role of community of practice has an important role in the creation of open innovation. With such a grouping and connecting of individuals, companies make whole regions of industrial zones or clusters, with very successfully developed industry. Participating in the process of innovation individual learns, acquires new knowledge, improves the already existing one, improves his/her competences, and develops professionally. In this study I shall research a process of generating new knowledge and use of that knowledge in a process of development of a product, and the process of innovation itself, as well as its commercial exploitation. It refers to prices, competition, and cooperation among the companies; competencies and individual inputs to execute the projects in the production process. In empirical part of thesis I will use data obtained by the REFLEX and HEGESCO questionnaires for Germany and Slovenia, having involved approximately 3.700 graduates five years after the end of their study period.

**KEY WORDS:** knowledge, external knowledge, innovation, open innovation, networking, competencies, community of practice, strategy, coopetition.

## IZVLEČEK

### Vpliv zunanjega znanja na koncept odprte inovacije v Sloveniji in Nemčiji

Osnova inovacije je znanje. Inovacija je definirana kot uporaba znanja. Univerze so pomemben vir zunanjega znanja za inovacije v podjetjih. V tej nalogi želimo dokazati, da ima zunanje znanje, ki je bilo postavljeno v vlogo skupnosti praks, pomembno vlogo pri ustvarjanju odprte inovacije. S takimi skupnostmi in povezavami posameznikov podjetja ustvarjajo celotna območja industrijskih con ali množic, ki zelo uspešno razvijajo industrijo. S sodelovanjem pri procesu odprte inovacije se posameznik uči, osvaja novo znanje, izboljšuje že obstajajoče, izboljšuje svoje sposobnosti in se strokovno razvija. V tej nalogi bomo raziskovali proces ustvarjanja novega znanja, njegovo uporabo pri procesu razvijanja izdelka in sam proces inovacije ter trgovsko izkoriščanje. Nanaša se na cene, konkurenco, sodelovanje med podjetji, sposobnosti in na posameznikov prispevek k izpeljavi projektov pri proizvajalnem procesu.

V empiričnem delu teze bomo uporabljali podatke, pridobljene z REFLEX in HEGESCO vprašalnikom za Nemčijo in Slovenijo, vključenih je bilo okoli 3700 diplomantov, ki so svoj študij končali pred petimi leti.

**KLJUČNE BESEDE:** znanje, zunanje znanje, inovacija, odprta inovacija, mreženje, sposobnosti, skupnosti praks, strategija, koopeticija

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## INTRODUCTION

The area I am scrutinizing in my master thesis is an innovation of the organization and influence of knowledge to innovation. Innovation is one of those words which are accidentally all around us, and it is difficult to imagine any successful company without innovations. For approximately one hundred years innovation was a topic for discussion and debate, it is a vehicle of growth and development. Our industrial and economic development in the XIX century is the result of technological progress (Trott 2012, 6).

The first person to discover the importance and inter-connectivity between economical growth and new products was the Austrian economist Schumpeter (1932, 1939, 1942) - the author of the first theory about innovation. He established that competition between new products is more important than marginal change of prices among the already existing products (Trott 2012, 6). The Schumpeter's idea was that innovation represents a "creative destruction" or a wave that restructures the entire market and whoever is the first to implement consistency shall benefit (Trott 2012, 7).

In further research of his literature Paul Trott (2012) notes that the first to suggest that innovation is connected with the wave of economic growth was Karl Marx. A series of studies about innovations started in the 1950s. Research was focused towards the internal characteristics of the innovative process within an economy, whereby the following processes were studied: creation of new knowledge, use of that knowledge in a development of products and processes, commercial exploitation of such products and services in terms of generating income (Trott 2012, 8). In this study I shall research a process of generating new knowledge and use of that knowledge in a process of development of a product, and the process of innovation itself, as well as its commercial exploitation. It refers to prices, competition, and cooperation among the companies; competencies and individual inputs to execute projects in the production process.

The basis of the innovation is knowledge. Innovation was defined as a use of knowledge (Trott 2012, 17). As Nonaka (2007) stated that in the economy where the only certain thing is uncertainty, the only safe remaining source is knowledge. When markets change, technology grows, competition multiplies, and products become obsolete overnight, hence the successful companies are those that permanently create new knowledge, expand across the organization and quickly translate to new technologies and products (Nonaka, Toyama 2007, 2).

These activities are defined as “knowledge creates a company” and are as per Nonaka never-ending innovation. It is necessary to mention the role of science and technology, whereby definitely we have to include knowledge. As Lefever (1992) defines a relationship between science and technology as one where technology is often seen as an application of science and science is a systematic and formulated knowledge (Trott 2012, 18). The definition goes as follows: *Technology represents knowledge applied over products and production processes*, and it could be a great starting point signifying that technology as well as education cannot be bought from a shelf like a can of tomatoes. They are an integral part of knowledge and skills (Trott 2012, 19). As Nonaka and Toyama (2007, 10) specified - knowledge lies inside the individual.

In times of financial and economical crises when market relations become more complicated, innovation plays even a greater role. Many companies believe that investing in innovation is not profitable as they try to save money overall and this also includes innovation. These companies decide to adopt ideas which were tested in the past and thus deemed useful (Rigby et al 2009, 79). This is one of the acceptable ways to manage a business, although innovation in the time of crises plays a great role, as the purchasing power is decreased and people are focused towards the new, hence they value innovations more as stated Quelch i Jocz (2009, 57). When the market situation improves and crisis has passed, the majority of consumers will be ready to try new products, which in turn gives a company a great competitive advantage compared with others. This is one of my research questions in this part - specifically how successful is the role of competition on the market?

Despite scientific discoveries that happened throughout the XIX century, for many industries at the outset of the XX century, it was impossible to create in advance a system which would allow the use of external knowledge. That occurred at the time of Einstein, Bohr, Curie, Pasteur and Planck, and huge chapters of science were yet to be understood, so the utilization of it was very far from practical exploitation (Chesbrough 2008, 22). That was the time when it was generally considered that in the practical application of science no scientists would participate, as they did not have time to waste their talents and skills in resolving commercial problems. If they participated in the development of industry it was perceived as a credible threat to science itself. In the beginning of the XX century the void was felt between the foundation of science and university lectures and the useful application of that knowledge for commercial purposes.

The knowledge being created within the universities looked promising, yet growing companies could not rely on that knowledge that was to be used in industries. Universities lacked financial means to set up and execute significant experiments (Chesbrough 2008, 23). One of the great changes in terms of knowledge was a unique relationship between state universities and corporations developed in the USA in the first half of the XX century. In accordance with Chesbrough (2008), who described the educational system in America, it was highly decentralized (even in the state universities), which was just the opposite of the European educational system. Industries such as mining, agriculture or engineering profited to a great extent from the knowledge and technology emanating from the state universities. Private universities were not responsible to national bodies, so they were free to follow their own scientific and technological agendas (Chesbrough 2008, 25). This historical note was important to mention as the ***topic*** of my thesis is the influence of external knowledge to the innovation process in companies. As a result of decentralization, a change in local financing, as well as the increased focus on higher education, the number of quality American universities grew steadily. As a result of that, a number of qualified engineers and scientists were ready to apply their knowledge in domestic laboratories managed by expanded corporations (Chesbrough 2008, 25).

World War II was a catalyst for efficiency, productivity and innovation in American industry. That was the time when the atomic bomb was invented and the first computer was used for non-military purposes. President Franklin D. Roosevelt stated: "New frontiers of the mind are before us, and if they are pioneered with the same vision, boldness, and drive with which we have waged this war we can create fuller and more fruitful employment thereby achieving a fuller and a more fruitful life" (Chesbrough 2008, 25).

# 1 THE CONCEPTUAL FRAMEWORK

## 1.1 The goal of a master thesis

The topic of this master thesis is how the external knowledge influences a theory of open innovation in organizations in Slovenia and Germany. I would like primarily to define what external knowledge, and innovation is and how that knowledge is used to arrive at innovation and result in the successful implementation of innovation in all phases of its development. Thereafter, I shall attempt to explain how great resources can be acquired through the knowledge possessed by an individual and how this is to be used in an organization in a wider context.

Also I shall investigate how organizations cooperate and share their knowledge not only within the region but also globally. Porter believes that geographical, cultural and institutional closeness secure a special approach for a company where closer relations and links further develop better information, powerful incentives and other challenges, which are difficult to manage from afar. Thus, they lead not only to increased productivity of the region-based companies, they also give impetus to innovation and stimulate creation of new business in a cluster (Cooke 2011, 393).

From that idea my research question was born, namely: "How do capable individuals take over an initiative during the establishment of professional contacts with experts outside the organization?" In order to establish good professional contacts with the outside experts, it is necessary to maintain a cooperative style of work, which functions well, and that is actually an advantage where people acting as decision-makers in their field may communicate with their colleagues in order to take the best possible decision. In such organizations, the atmosphere of cooperation is very highly regarded, while other advantages of such cooperation are: the challenge, atmosphere, good peers, independence and learning (Wulff 2007, 77).

THE GOAL of my master thesis is to prove an efficient use of (external) knowledge and its influence in the creation of innovation in an organization, as well as the following:

- Define basic terms related with innovation and knowledge;
- Study factors of innovation in an organization;
- Study interdependence among the organizations and their surroundings, which is simultaneously the transfer of knowledge or the use of external knowledge;
- Study how competition influences the success of an organization, and what types of strategies are used for cooperation with other subjects and institutions from the same industry, for instance. "In a competitive regime the content dimension is associated with the process dimension. The content dimension is regulated by economic and social aspects, the process dimension by the competitive and collaborative sides of the relationship" (Dagnino, Rocco 2013, 13);
- With the help of HEGESCO and REFLEX questionnaire and statistical program SPSS establish links between the concepts of external knowledge and innovation as well as their interdependence.

## 1.2 Structure of the master thesis

This thesis consists of two parts: theoretical and practical. In the first part I would like to define the terms, starting with innovation and external knowledge, competences, intellectual property, competition, the theoretical part will conclude with the formulation of hypotheses.

A second part is the empirical one, and with the help of analysis of secondary data of HEGESCO research with statistical program SPSS (for the Slovenian territory), I would like to demonstrate that external knowledge and the sharing of experience between workers influence decisively the ability to innovate a company and therefore check the validity of the set hypothesis.

I used the International Reflex Studies research (Research into Employment and professional Flexibility) conducted in 2007 with the participation of the following countries: Austria, Belgium, Czech Republic, Estonia, Finland, France, Italy, Japan, Netherlands, Norway, Portugal, Spain, Switzerland and the United Kingdom. I used data for Germany. The study HEGESCO (Higher Education as Generator of Strategic Competences) includes the following countries: Lithuania, Poland, Hungary, Slovenia and Turkey. The REFLEX survey sample includes the 70,000 graduates from these countries who have graduated in the study year 1999/2000. The study observed that modern society demands competencies and knowledge of its graduates and a level of competence that the graduates achieved throughout their education. The aim of this project was to contribute to the results already obtained with an efficient policy in higher education, to reshape higher education programs, so that anyone could acquire the competencies relevant to modern society.[1]

One of the goals of my work is to prove that knowledge, innovation, environment, pricing, and competitive marketing function in different environments. I took Germany for comparative analysis because it is a country which is the largest economic partner of Slovenia. Economic ties between Slovenia and Germany have a strong and long history, with the potential to widen and strengthen further in future. Germany is a country leading innovation in Europe. It has a high level of investment in Slovenia, and consequently has a positive impact on the Slovenian economy. Thus, relating to innovation development, Slovenia falls into a category of countries known as: “follower of innovation” (Innovation Union Scoreboard 2013, 50).

1 To use the base I received permission from Tim Hujjgen from University of Maastricht (ROA).

### 1.3 Methodology of work

A key source of information for the theoretical part is scientific technical literature and various research approaches by different authors. By processing the theory, I used multiple types of methodological approaches - a method of classification based on the general concepts occurring in the hypotheses. With the method of description I depicted various facts and knowledge, which are created on the basis of past experience of other authors, and the method of analysis. I have been studying each term on its own, and in relation to other concepts (knowledge, innovation, competence).

I will use data received by the usage of the REFLEX and HEGESCO questionnaires. The available data is valid for the Republic of Slovenia, and it is adapted from the HEGESCO researched by the Faculty of Social Sciences and coordinated by the University of Ljubljana from 2007 to 2009.

In the empirical part which will be described more precisely later, a key source of data processing is a statistical method of frequency distribution of the individual variables, their mutual connection or correlation and regression analysis.

## 2 KNOWLEDGE AND TYPES OF KNOWLEDGE

Something that should be distinguished in defining the concept of knowledge is the difference between data, information and knowledge. The data is usually defined as a set of symbols or fact. Boisot (1998) defines data as the distinction between physical states of (black, white, hard, easy), which may or may not be passed on as information to the agent, it means the data is only observing events and subjects. According to him, the information in these observations is codified, while knowledge is the ability to use information (Boisot 1998). According to Sanchez-in (2001, 5) data is a genuine representation of an event that people notice and that can attract the attention of other people in the organization.

The information consists of qualitative and quantitative description of the event. It is information that is capable of producing the effect (Luhmann 2000 in Styhre 2003, 59). Bateson (1972, 381) gives a broader definition of information that a technical term information can be concisely described as any differences that may make a difference in a later event. Norbert Wiener, a founder of cybernetics, says that the information is a matter of

order in the system, “the amount of information is a measure of the degree of order which is particularly associated with these consumption patterns to be distributed as a message in time” (Styhre 2003, 59). The data with the meaning of which is located in a particular context is “information” (Pavlin 2007, 37).

Knowledge is often defined in relation to the information, if the information is data with meaning, then the knowledge is information with the meaning (Pavlin 2007, 38). Daniel Bell (1973, 175) defines knowledge as a set of organized statements of facts or ideas, presenting the understandable assessment or experimental result, which is transmitted to others through communications media in a systematic form. Bhatt (2000, 16) argues that it is very difficult to define the knowledge and according to him it is an organized combination of ideas, policies, procedures and information. Wenger and Snyder (2000, 140) added that the use of knowledge relates primarily to communication: knowledge representation is a matter of competence defined in communities.

Knowledge is something that is used on a daily basis in any organization and it is quite complex. Blackler (1995) argues that knowledge is embrained, which means that it is at least partially located in cognitive and perceptual abilities in human beings. Knowledge is embodied and derived from the capacity to use one's body, embedded in the systematic routines, encultured on local cultures, and encoded conveyed through signs and symbols. In literature about knowledge management from a position of knowledge rationally there are three concepts that of belief, originality and creativity. An individual testifies to the sincerity of his/her beliefs based on observations of the world; these observations depend on the unique point of view, personal sensitivity, and individual experience. So, when somebody creates knowledge, he or she makes sense of the new situation by holding justified beliefs and ending the same. Under this definition, knowledge is more a construction of reality than what is true in any abstract or universal perception (Von Krogh and Nonaka 2000 in Sthyre 2003, 63).

There are four basic categories of knowledge: knowing what, how, know why and know who. According to Lundvall and Jonson (1994) to *know what* is the knowledge of facts, recorded in the form of information. Kusunoki (2004) disagrees with it and according to him to know what responds to the question of how the product or service was composed, in order to gain a certain value in the eyes of the customers (Pavlin 2007, 41). To *know how* according to Lundvall (2004, 5) refers to skills which implies the ability of an individual to do something, in all areas, not only in production. To *know why* implies the understanding of cause and

effect, and refers to the knowledge of the principles and laws of nature, mode of action of individuals and society. Lundvall (2004, 5) points out that this form of knowledge is extremely important for technological development in different industries, so as to represent the different levels of organizations and individuals, experiential and intuitive framework for action. To *know who* is the fourth category, which by Lundvall (2004, 6) is a set of different individual and social skills, refers to the skills of communication and connecting people, who have different skills such as: who knows what and how to do it, represents the complex of different individual and social skills.

Knowledge is a variable mix of creative experiences, values, thought - related information and professional insights, which provides the framework for evaluating and incorporating new experiences and information. In the organization it is often involved not only in the documentation and archives, but also in the organizational rules, processes, practices and standards (Davenport and Prusak, 1998). In managing knowledge it is essential to comprehend knowledge (be aware of knowledge).

Regarding the types of knowledge and an access to it - it is important to ascertain connectivity of strategies and goals of the organization, with a need for new knowledge and ways of acquiring it.

One of the basic definitions of knowledge is that knowledge includes facts, information, and descriptions of the required skills through experience and education. It can refer to theoretical and practical understanding of the subject. Since there are many types of knowledge, there are some distinctions between explicit knowledge and tacit. We have both static and dynamic knowledge, declarative knowledge (knowledge of facts) and procedural knowledge (knowledge of how to develop situation). Then we have the abstract knowledge (which may relate to many situations), and the knowledge that is specific (applies only to a specific situation) (Gamble and Blackwell 2001, 64).

For our understanding we will use a typology of knowledge of Polany (1967), who divided knowledge on tacit and explicit knowledge. Tacit knowledge is personal, context specific and hard to formalize (articulate). Explicit and implicit or codified knowledge reflects the knowledge that can be translated into a formal systematic language. Tacit knowledge is composed of experiences, feelings, perceptions, emotions, intuition, and so on. This is different from the explicit knowledge that we can easily express with words and numbers and transferred it to the group, and can remain in the ownership of the organization.

Choo (2005, 11) argues that organizational innovation germinates from seeds of tacit knowledge. We can conclude that knowledge exists at a level of the group and at an organizational level. It is a valuable potential of the organization, a unique expertise, it represents achievements: from individuals who work in a specific environment of the organization. Tacit knowledge becomes real value when changing to new features, products and services. Innovations are realized when the implicit knowledge is on the surface, and it is transformed into objects or systems. Tacit knowledge gets a new value when it becomes explicit (Choo, 1998).

Three terms that kept the process which companies use to convert tacit knowledge into explicit are: first, linking contradictory things and ideas through a metaphor; then resolving these contradictions through analogy; and finally, crystallizing the created concepts and embodying them in a model that allows knowledge to be available to the rest of the company (Nonaka and Takeuchi 1995, 35).

Knowledge as such cannot be controlled mechanically. It refers to the widening horizons and the process of analyzing components of embodied knowledge, which is essential for knowledge. It refers to the undocumented information, such as intuition, empathy and experience that allow us to make the right decisions in most cases (Gamble and Blackwell 2002, 13). It does not mean that decisions are made in the company without any concept. There is also represented knowledge which usually consists of data, documented information and artifacts that are the basis for decision making. The advantage of this knowledge is that it can be easily transferred within the organization. "Embedded" knowledge exists in processes, products, policies and procedures, and often it is considered as an essential part of the management of knowledge (Gamble and Blackwell 2002, 13).

## 2.1 The search for external knowledge

External knowledge is an important source for technology innovation. The effect of external knowledge on the impact of technological innovation can be very different and depends on the sources and methods of external knowledge. We have identified three distinct origins of external knowledge: the transmission of information through informal networks, R&D (research and development) cooperation and technological acquisition of knowledge.

*Science is defined as the systematic and formulated knowledge*. There are significant

differences between science and technology and one of the definitions is that: the technology is knowledge applied to the product and the production process (Trott 2012, 19). Knowledge is embedded in the technology and skills.

Katila and Ahuja (2002) have extended a concept of exploration and exploitation of the proposed new terms: “a search ring” and “search depth” to better describe the use of external knowledge. “The search ring” describes how widely companies seek new knowledge, while “the search depth” describes a degree of reusability of existing knowledge. They analyzed the effects of these factors on the performance of technological innovation (Kang and Kang 2009, 3). Other authors (Laursen and Salter 2006, 135) have also set up a two-dimensional image use external knowledge defined as “breath” - as a variety of external sources of knowledge and “depth” - as the diversity and important source of external knowledge. They analyzed the effects of the “breath” and “depth” to the success of technological innovation in companies and found inverted U-shape relationship between the two determinants of the success of technological innovation. The ultimate goal of these tests was to investigate the relationship between the degree of use of external knowledge and innovation performance. Kang and Kang (2009) carried out a study which represents an alternative model of measuring the scope and use of external knowledge that takes “the breadth and depth” at the same time. The effect of using external knowledge in technology innovation performance varies depending not only on the extent of use of external knowledge, but also on the type and origin of external knowledge.

There are different criteria for a classification method of using external knowledge sources, such as transfer of information from informal networks as one way to get to know, and does not require formal agreements or contracts and does not develop organizational interaction between companies and external sources of knowledge (Hakansson and Johansson 1992). According to the same authors, an informal network for transfer of information has the characteristics of social networks. The informal network that has the characteristics of a social network does not require large transaction, and management costs as well as maintenance costs. Through these advantages, companies can gain more knowledge via an external easier way to react promptly to rapid changes in the environment or crisis and innovate more easily. That is how they secure self-survival. Today, due to the rapid growth of IT and communication technologies, the cost of external search for information so as to reduce the effectiveness of the acquisition of knowledge, is rapidly improving. So the company can acquire, retain, and use more information under conditions of limited resources, or external

information can be used for technology innovation more effectively.

According to Hakansson and Johansson (1992) the adoption of technology can be classified as a formal network if you build a formal contract. Technology adoption causes the short term organizational interaction for the transfer of technological knowledge. However, technology adoption has poor performance because it causes less organizational interaction in the long-term perspective. Companies do not have to maintain a connection when the contract is completed.

Taking into consideration the open innovation, Chesbrough (2003) emphasizes the importance of active adoption of technological innovation and proposes to raise the technological uncertainty as one of the main motives that the company choses a strategy of open innovation. Under the conditions of very high technological uncertainty, companies rather choose the technological adoption than to extend the internal R&D. It becomes increasingly difficult to maintain a competitive advantage through internal R&D, because the increase of knowledge, technological developments and changes in the business environment is very fast. Global giants such as Procter & Gamble, IBM, CISCO also follow innovation and growth through active adoption of external technology (Chesbrough, 2003 at Kang and Kang 2009, 6). Chesbrough (2003) experience is such that when companies have problems that cannot be resolved through internal R&D, or when they are required to disclose new technology very quickly – the use of technology adoption offers a great advantage to companies and technological innovation as well as winning the market. So when a company is making technological innovation, degree of use of technological adoption has a positive effect on performance and technological innovation (Kang and Kang 2009, 6).

The search for knowledge is not only based on technology but also on geographic search (Almeida, Phene and Grant 2006, 359). Studies on innovation and spreading knowledge and technology have established that there is a geographical localization of knowledge. Analyzing data from many companies it turned out that they cooperate with universities seeking knowledge from each other in certain geographic locations. A key reason is that knowledge remains in a certain geographical area, where the connections and exchange of knowledge between companies in the region are being executed. Those connections can be in the form of formal and informal alliances, such as social networks or regional mobility of engineers. Local knowledge sharing was known among the companies that were involved in the production of iron in the 19th century in England. Companies explore regional ties and there

are examples from Germany and Italy, where external knowledge spreads through networks in these regions. Motto who brought Alfred Marshall in twenties “industrial district” or the Porter's 1998 “industrial clusters” is that industrial-specific knowledge is developed in geographically concentrated locations. This phenomenon is true not only in the traditional airline industry but also in the high-tech industries. This leads to a huge transfer of knowledge between companies, due to the similarity of their basic knowledge and extending relationships that develop in the region (Almeida et al. 2006, 362).

A regional innovation system is defined as an interaction between knowledge gathering and utilization of sub-systems interconnected in global, national and other regional systems (Cooke 2011, 394). Asheim, Coenen and Vang (2006) state that regional innovation system is in order when the following two sub-system players are involved in the interactive learning: a regional support of infrastructure and a system of knowledge - a generation consisting of public and private research laboratories, universities and colleges, transfer of technology agencies, institutions for further education and others.

A regional structure of production or sub-system knowledge exploitation often consists of companies especially in instances where sub-systems have tendencies to be grouped into clusters (Cooke 2011, 394). There are a few elements in an institutional context which influence knowledge - sharing and creation and ultimately innovations. Sometimes those influences are direct and occasionally are exercised through networks: on the other hand knowledge institutions, political management, financial infrastructure and a given industrial context (competitions, interaction among the companies in the value chain, presence of key companies etc) often represent indirect influence (Cooke 2011, 395). For example, Siemens cooperate with universities worldwide, and they have 8000 projects in which more than 800 universities participate.

In Berkley and Shangai, Siemens has various activities where they maintain a direct link between universities and entrepreneurs. The Siemens technology and business programs discover ideas and a striving to assist these companies in the earliest phase of idea-development, which ultimately gives added value to Siemens (Lackner 2009, 8).

Industrial clusters are formed to gain a competitive advantage from external economies and to increase company's profit (Isaksen 2011, 293). A creation of clusters is related to preconditions such as a triggering event, which transforms a location to a new productive use which initiate cluster development. Other preconditions are: availability, raw materials

resources, specific knowledge and R&D organization or experience based knowledge, or a specific or sophisticated need of geographically centered buyers or companies (European Commission 2002, 14). Very often actions of entrepreneurs set all these wheels in motion. Feldman and Francise (2006) believe that active entrepreneurs may respond to certain external shocks, such as technological and market possibilities, and by creating new companies they ignite a spark which is essential for creation of growth a cluster (Isaksen 2011, 294). Entrepreneurs are often very responsible, and they possess certain local inertia; some individuals create companies based on previous knowledge, experience and contact connected with a specific location. In certain industries some areas may earn an advantage of "first Entrepreneurs" in certain industries (Isaksen 2011, 295).

A creation of industrial districts in 1960s in Italy (northwest and central parts of Italy) was based upon experience - based knowledge. That part of Italy created growth in production industries 1960s and 1970s as opposed to other parts of Italy (Becattini, Sengenberger and Pyke 1990, 40-41). A growth of industrial districts started in traditional areas of design, such as furniture, textile, clothing, shoes, ceramics, and mechanical engineering. A growth of industrial districts was also recorded in small and medium enterprises which were concentrated in particular areas where the companies created local networks. A growth of industrial districts was explained by a combination of general and specific factors. General factors refer to the growth of the market outside Italy, due to better traffic infrastructure and enlargement of markets in the EU; increased demand for products from other industries, such as high quality products in small series, where SMEs have greater chances in comparison with big companies; and with technological innovations such as computer based production creating a small series of products more efficiently (Amin 2000 in Cooke 2011, 295). A growth of industrial districts was also based upon social and cultural factors which are tied with certain territories (Asheim 2000 in Cooke 2011, 295). This is connected with specific competence such as tradition, entrepreneurial knowledge and SMEs management in agriculture, old knowledge and networks in trade and export circles (Becattini et al 1990, 44); tradition in handcrafting and early existence of technical schools. Growing and developing clusters bring profit to companies as well as *know-how* from other participants in clusters through participating in planned and spontaneous and unpredictable learning processes.

Maturity of clusters consists of three characteristics: the first one is a historical development and support of informal institution or social capital (I emphasize a role of institutions in maintaining social relations). Social relations keep essential information and sources

available. A huge benefit is a trust between the actors which increases the productivity and innovations (Isaksen 2011, 297). The second characteristic of a cluster maturity is connected with a direction of extra-regional relations or global developments. Companies from mature clusters can easily find their suppliers, modules services and require scientific knowledge outside of the cluster boundaries and their function on a world class level. Companies from a cluster are often seen as a part of the global network led by big multinational corporations (Isaksen 2011, 298).

A third characteristic of mature clusters implies that they are often rich in terms of organization; they are very dense and intertwined with supporting public and private organizations (Todling and Trippl 2011, 460).

Technological clusters are significantly different from other industrial clusters in a way that they are closely interrelated in early phases of the industrial life-cycle, as well as with their sources at a level of regional support, growth and innovation (St John and Pouder 2006 in Cooke 2011, 315). A basic activity of a technologically based sector is investigation, and its main entry is knowledge. For companies situated close to sources of knowledge (for instance universities and research centers) and which are grouped on the specialized workforce market, it tremendously increases possibilities of collective learning and further enhancement of entrepreneurial possibilities (Audretsch, Keilbach and Lehmann, 2006). Porter (2000) claims that technological clusters function on the basis of knowledge-growth and localization of learning among companies, suppliers services, companies from the similar industries as well as related institutions such as universities standardization agencies and trade associations (Malecki in Cooke 2011, 316).

Key institutions of technological clusters are universities and research institutions, because relevant knowledge is created there. Castells and Hall (1994) identified three functions of university in a development of technological clusters. Firstly and the most important one is to create new knowledge, both basic and applied. Secondly, universities train a workforce of scientists, engineers and technicians, which are the key ingredient for the development of new technologies. Thirdly, universities may have a direct entrepreneurial role, by supporting a spin-off within local companies' networks. An example of the establishment of entrepreneurship in the sophisticated knowledgeable environment is an establishment of industrial parks or incubators in liaison with universities (Audrech et al 2006).

Together with a government and industry universities support developments of companies,

which in turn creates self-sustainable dynamic whereby industrial actors become increasingly prominent in creation of new companies (Malecki 2011, 319).

## 2.2 Transfer of external knowledge

There are various ways to represent knowledge in a company. Traditional knowledge is "placed" in the reports, guidelines, and databases. But how is this knowledge transmitted? It is possible to convey it in an informal way, through anecdotes, for example, or through the diagram - the point is that both sides understand and remember the new information they received. There are also different ways of how to use knowledge. Different forms of organization and different people can achieve similar results using different methods. For example, large companies that have a tradition of managing the organization of work can be very skillful and flexible in the detection and management of knowledge (Gamble and Blackwell 2001, 65). That means that the knowledge available in the company must be accessed from different sides and should be used in the right place at the right time. Having an implicit nature of knowledge exchange, spatial and cultural proximity is an important prerequisite in exchanging knowledge. Studying the networks that are located in Silicon Valley, Saxsenian (1990) pointed out that the link between an individual from different organizations facilitated the transfer of knowledge across agents, companies and even industries (Di Guardo, Galvagno 2005, 183).

Transfer of knowledge depends on how easily knowledge is to be transferred, interpreted and absorbed. According to the Saxsenian research it depends on the flow of communication and connection between organizations. Companies are characterized by geographical proximity with a tendency to create rules that promote cooperation among them. As these rules are generated via network structure, the structure itself affects later behavior (Di Guardo, Galvagno 2005, 183).

The second level of knowledge transfer is the transfer of knowledge alone; in order to lead the transfer it is necessary to build connections with external sources of knowledge, which play the role of a pipeline for the transmission of knowledge. These are the pathways channeling available external knowledge and skills. They also determine which knowledge a company shall use actively in the process of innovation. Mechanisms of transfers include the engagement of scientists and engineers, then the formation of strategic alliances and informal

networks are appropriate to a particular geographical location (Almeida, Phenom and Grant 2006, 362). There are three mechanisms of learning and knowledge transfer: alliances, mobility and informal mechanisms associated in certain geographic regions.

*Alliances* are useful mechanisms in which the knowledge acquired over the years has grown so much in "learning networks", including R&D alliances. In such conditions, learning is created and utilized in a multi-dimensional environment. Furthermore, relevant tasks, processes, skills and quantity of learning are limited by the initial conditions (Almeida, Phenom and Grant 2006, 361).

*Mobility* is another mechanism for the transfer of knowledge and relates to people who are important in the transmission of internal knowledge in a company. Markusen (1986) observed that regions with a high concentration of workers, experts in technology, attract high-tech investors. There are a number of descriptive studies which clearly show that people are carriers of knowledge throughout the company, and that engineers are the main holders of internal knowledge in companies (Almeida, Phenom and Grant 2006, 362).

*Informal mechanisms associated with geographic regions* are the third important segment of knowledge transfer. Take the example of Silicon Valley in the United States. Informal mechanisms refer to the dynamism and vitality as well as expanding networks within companies and between companies and universities, customers and suppliers, etc. It also includes interactions among individuals in the region. Another example is networking in Italy between potters with other small businesses in the region. Certainly, knowledge transfer depends on the characteristics of a company, such as the size of a company, access to knowledge through a variety of mechanisms, etc. Perhaps in the future the question will arise which of these three mechanisms would be the most successful in the transfer of knowledge?

Information is central to a functioning company and it is a stimulus for knowledge, *know-how*, the skills and expertise. It was pointed out that an industrial context transforms knowledge into action in the form of projects and activities. That is, when information is used by individuals and organizations, it then becomes knowledge, although sometimes it is tacit knowledge. The application of this knowledge leads to action and skills (projects, processes, products, etc.) (Trott 2012, 350). We will mention several models of technology transfer which have been applied over the last 20 years.

A *licensing* means that the owner of technology license receives fees in order that users have

access to the technology thereof. Licensing is one of the main income generators to the British Technology Group (BTG). It helps businesses and universities to achieve profit from their intellectual property through licensing of technology to third parties (Trott 2012, 352).

*Science park model* is a phenomenon originating in the United States. The idea was to develop industrial areas or districts close to existing centers talents (excellence), and often close to the university. So scientists could promptly implement their ideas into real products, for example the Silicon Valley, a collection of companies with research activities in the field of electronics and the "research triangle" in North Carolina which have several universities as its basis. In the UK one of the first science park models was the first Cambridge Science Park. In the last 20 years, it has grown into an industrial zone and has attracted highly successful science-based companies; and other examples are Southampton, Warwick and Cranefield (Trott 2012, 353).

*The intermediate model* includes RTC (Regional technological center) which serves as an intermediate between companies seeking and offering technologies (Troot 2012, 353). *The directory model* companies such as Derwent World Patents, Technology Exchange, NIMTECH and Technology Catalysts offer a directory listing of their technologies free to be licensed. *The knowledge transfer partnership model* is active in a field of technology transfers from universities to small companies. It is executed by post-graduate students, who spend two days a week at universities, and three days a week in companies - however they are being committed to relevant projects all the time. This program functions successfully for 30 years already (Trott 2012, 353).

*The Ferret model* was used for a first time in defense related companies, and initiatives came from Great Britain Ministry of Defense and consortium of companies researching new technologies. The idea was to commercialize such technology, in a way that scientists and engineers familiar with that technology would go to other companies and then adapt the technology for a commercial use (Trott 2012, 355).

One of the oldest and most efficient models of technology transfer is *employment of qualified workers.* If a company needs an expert, he or she will be hired from another company or from university, so he/she would bring in his/her previous knowledge (Trott 2012, 355). Technology transfer units were formed in 1980 by the US Federal laboratory and other research organizations including universities, by establishing industrial liaisons as well as technology transfer units in order to bring technologies from outside or to find partners to

assist in researching domestic developments. Universities from Europe rely on government and their funds; therefore they recognize potential benefits from in house technology researches (Trott 2012, 355).

*The research clubs* is a program created by the British governments department of Trade and industry (DTI), which attempts to connect companies with a common interest in certain research fields. Some of them are involved in joint research others share information knowledge and experience. One of the most successful clubs is M 62 Senzori and instrumental research club, funded by the group of companies along M 62 highway in the North West England (Trott 2012, 355). European space agency (ESA) offers access in space research, virtually in all fields of science and technology. This goal was achieved by combining three models: ferret model, directory and intermediary model (Trott 2012, 356).

The fastest growing branch is *consultancy*, which did not exist in 1980s, whereby nowadays it represents multi-million industries. Management consultancy is just one area, and various experts created knowledge and skills in many fields of science, so they offer their very specific skills to industry at large. Consultants often offer advice and useful contacts for the sake of their research project, in order to begin an operation with a big science based organization. Very often they are a part of the research in first years of a project. This is a very popular way of technology transfer and basically its core has adopted a model of employment of qualified workers (Trott 2012, 356).

### 2.3 The integration of external knowledge

The last level in the discovery of new knowledge is through integration into existing knowledge also in other parts of the company and ends up with innovation. A large number of people quoted definition of innovation which was performed by Schumpeter (1934) that innovation is in fact “to achieve or perform a new combination”, and refers to the knowledge. The question is how to integrate this knowledge? Since knowledge which is passed into the firm needs to incorporate the existing system, according to Nonaka and Takeuchi (1995) refers to “a combination of knowledge”, which creates a “systematic knowledge”. What kind of knowledge is integrated in innovation? It is easy to integrate explicit knowledge which is formally and systematically easy to communicate, share, and use of a computer program (Nonaka 1991, 13). In the context of another dimension we have become aware that there is a

"tacit" knowledge. This is a very personalized knowledge, which is difficult to formalize, which means that it is difficult to communicate or share with others (Nonaka, 1991). Westerners emphasize explicit knowledge, while the Japanese tend to tacit knowledge. Tacit and explicit knowledge are not completely separate, they are together complementary entities (Nonaka, Takeuchi 1995, 61).

Knowledge is created and expanded through social interaction between the tacit and explicit knowledge, Nonaka and Takeuchi (1995, 61) referred to an interaction "knowledge conversation" it should be emphasized that this conversation is a "social" process between individuals, not restricted within the individual. Tacit knowledge is partly composed of technical skills that are hard-defined, and can be classified under the term "know-how" and at the same time has an important cognitive dimension. It consists of mental models, beliefs and perspectives which we take for granted, and we cannot articulate. Since learning is a dynamic process that means that it can be combined between explicit and tacit knowledge, thereby creating knowledge within any organization. There are four combinations of these two types of knowledge that are essentially the transfer of knowledge from tacit to tacit; from explicit to explicit; the third kind is from tacit towards explicit and at the end from the explicit knowledge towards tacit (Nonaka 1991, 15).

*Tacit knowledge to tacit knowledge*, otherwise called socialization is the process of exchanging experiences and thus creates tacit knowledge such as the exchange of mental models and technical skills. An individual may acquire tacit knowledge directly from others without the use of verbal language, referring to the observation, imitation and practice (Nonaka i Takeuchi 1995, 62). It can be illustrated by examples from the accumulated knowledge through experience at work, for example when an accountant develops innovative, new approach to control the budget, based on his years of experience.

From *tacit to explicit knowledge* so called externalization and represents the processes of the articulation of silent knowledge in open (explicit) concept. It is essential in the process of creating knowledge that tacit knowledge becomes explicit, taking the form of metaphors, analogies, concepts, hypotheses or models. The terms are often inadequate, inconsistent and insufficient. However, these discrepancies and gaps between image and expression help to promote "reflection" and interaction between individuals (Nonaka and Takeuchi 1995, 64). It occurs when a person is ready and aware that it articulates the basis of her tacit knowledge, turning it into explicit knowledge has shared it with their team for development (Nonaka

1991, 18).

From *explicit to explicit* or a combination of the process systematization of concepts in the knowledge system. This way of conversation knowledge involves a combination of different bodies of explicit knowledge. The individuals share and combine knowledge through documents, meetings, telephone conversations or through network computer communications. Reconfiguration of existing information through stacking, sorting, adding, combining and categorizing of explicit knowledge leads to new knowledge (Nonaka i Takeuchi 1995, 67). This knowledge describes the example of the financial statements when collecting available data about the company and are synthesized in the report, is that the writing of the report is not a novelty, nor obtained via new specific knowledge (Nonaka 1991, 17).

From *explicit knowledge to tacit knowledge* or internalization is a process of embodied explicit knowledge into tacit knowledge. It is associated with "learning by doing", and experience through socialization. Externalization and combination are internalized in the silent knowledge of the individual in the form of exchange of mental models or technical knowledge becomes a valuable asset. In this process it really helps that knowledge is verbalized or documented in the instructions or verbal stories (Nonaka i Takeuchi 1995, 69).

The first example is when a new division of knowledge in the entire organization among workers becomes internal, using it to expand and reorganize their tacit knowledge. Another innovation workers take for granted as a basic tool and an essential source to complete their own business. Tacit knowledge is unwritten, unspoken and hidden in a warehouse base of knowledge in personal emotions, experience, intuition, observations and internalized information. It basically requires the level of Social Capital and resists electron transfer. It requires personal interaction to arrive to the knowledge that occurs only when a person inquires about the real issues to solve a specific problem (Cooke 2011, 290). Described transfers of tacit knowledge according to research are obtained only by learning through attempts and an error is by imitation but also through cultural and social context (Almeida et al 2006, 365).

## 2.4 Community of practice

Today's world economy is driven by knowledge and many companies have established the use of their own knowledge in different ways by simply naming it. So we have cross-

functional teams, users or production-focused business units, and working groups to maintain and extend a given idea or knowledge (or *know-how*). In many cases, work by these organizations is very effective, however, new forms of organization intended to supplement the existing structure, radically encourage knowledge sharing, learning and the change, which is called a community of practice (CoP) (Wenger, Snyder 2000, 139). This term given by Lave and Wenger (1991, 98) is characterized by a system of relations between people, activities and "world", evolving over time and in relations with other peripheral communities of practice.

Other definitions only build upon already existing ones and one of these is given by Hara (2009, 118) which states that the CoP are: collaborative informal networks that support professional practitioners and their efforts to develop and share a common understanding and engage in the work - and it is indeed relevant to the build-up of knowledge. Corriere, Paulos and Mesquita (2010, 12) understood CoP as a self-organized group of people who are motivated by a common interest related to a daily practice. This group is self-organized in order to develop knowledge and improve work efficiency through interaction among its members.

CoP is defined as a collection of individuals with limited informal relationships that share similar roles in business and a common context. These groups (as per Gamble and Blackwell 2001, 80):

- Voluntarily come together for a common goal;
- Have members who identify themselves as a part of the community;
- Are constantly involved in activities with other members and communities;
- Have interactions that may take an indefinite period of time.

The term community emphasizes personal grounds on the basis of which the connections of employees are made. CoP is characterized as a membership that is by nature a fluid and self-organizing entity. A social capital organization has three inter-relational dimensions, namely: structural, relational and cognitive dimensions (Gamble and Blackwell 2001, 80).

The structural dimension refers to a formation of informal networks that enable individuals to identify other potential resources. This includes relationships that have strong connections (individuals who have regular contact with each other) and those with weak ties (individuals with looser personal connections). This portraits the needs of people in an organization to

reach others who may have the potential, which they themselves do not have (Gamble and Blackwell 2001, 81).

Relational dimensions relate to a matter of trust, shared norms and values, obligations and expectations. They describe the interpersonal dynamics, whereby the best example of a definitive measure of high social capital is family. Social capital transferred to a family is transmitted through cultural mechanisms and it is based upon a strong belief that the actions of one member are two-sided, namely that individuals meet their obligations and that people honestly work with each other (Gamble and Blackwell 2001, 81).

A cognitive dimension refers to the necessity for a common language and context to build social capital. Without a common vocabulary it is difficult to make necessary contacts to create and nurture social capital. This is built through clear mechanism such as manuals, databases, guidelines or formal procedures or through silent mechanisms such as stories, analogies and metaphors.

These three dimensions of social capital affect a creation of fourth variable that influences the creation of so-called organizational knowledge (Gamble and Blackwell 2001, 81). Positive sides in this type of an organization in the company are manifold. They facilitate organizational learning and promote organizational memory (they provide a forum for an exchange of experience, information and knowledge and for a knowledge-creation) (Tarmizi and Žigurs 2006). They held tacit knowledge, facilitate communication (Ardichvili et al 2002) and accelerate cooperation between members of the community (Wenger at all in 2002) (Correira et al 2010). According to Saint-Orange and Wallas (2003) they increase the efficiency of knowledge. They increase the quality of the process in order to improve the competitive value. Coakes and Smith (2007) contributed to innovative knowledge, experience and the exchange and discussion of ideas - which are all critical elements for innovation.

Virtual CoP can be described as a space where knowledge happens, however, learning and innovation are closely linked with the practice, since the learning needed innovation to occur. These virtual CoP are ideally suited for development and innovation activities of small innovations. There are several other factors that can motivate and limit a process of knowledge creation.

1. *Internal factors (soft)* - members are involved in the works of creating knowledge, motivated by factors related to their personality and the pleasure that you feel when you

are sharing your knowledge with others (Krogh and Grand 2002).

2. *External factors (hard)* - financial reward, direct or indirect, to share and create knowledge (Hall and Graham 2004).

3. *Organizational factors* - related to an environment in which the group operates, including the following factors:

    a) Trust - in a shared environment it is a facilitator of communication and cooperation (Sharratt and Usoro 2003, 190).
    b) Moral obligation - members feel a moral obligation to return what they have gained from organizational CoP (Ardichvili et al 2002, 11).
    c) Access to information and experts in a particular field - it is another factor cited in the literature (Wasko and Faraj 2000, 169).
    d) Organizational culture - involving workers in the process of developing knowledge which is conditioned by cultural factors. It represents a culture that motivates and rewards forming and sharing of knowledge, creates favorable conditions for the development and creation of knowledge (Correira 2010, 13).
    e) Technological factors - between the limiting factors associated with technology, non-verbal communication (i.e. visual signals, rituals). These factors are essential for an exchange of silent knowledge which is available through a virtual community of practice (community practice) (Krogh and Grand 2001). Technology should therefore allow members to socialize, to be friendly and helpful - which in turn maintains a good "health" of the community (i.e. a number of registered members, a number of active members, and a number of created knowledge artifacts and their date of manufacture (Preece and Maloney-Krichmar 2003, 25).

Communities of practice (Community action practice) add value to organizations in several important ways: they help in management strategy, start new lines of business, solve problems quickly, transfers best practices, develop professional skills, help companies to recruit and retain talent (Wenger and Snyder 2000, 140).

In instances where the CoP helps management strategy it is thought that they are the heart and soul of knowledge management strategies such as that of the World Bank. The Bank has made knowledge management a key to the goal of becoming a "knowledge bank", providing a high-quality information and "know-how" of economic development (Wenger and Snyder

2000, 140). Communities of practice have the potential to start a completely new line of business.

It is also possible that a group of consultants from one company creates a community that eventually generates a whole new line of business (Wenger and Snyder 2000, 140).

Community of Practice solves problems quickly because they know who to turn for help and how to ask questions in order to focus on the core issues. One role of communities of practice is to transfer the best experiences and practices. It is also an ideal forum for the dissemination and sharing the best experience throughout the company (Wenger and Snyder 2000, 141).

Some companies have found that the Community of practice is a very useful arena for fostering professional development. For example, IBM's community of practice held their own conference, either live (in person) or online. Presentations, discussions in the hallway, dinners, and conversations in a break room are some of the places where ideas are exchanged, skills built and networks developed. Community of practices helps companies to recruit and retain talent, which is often a subject of big competition in the business world (Wenger and Snyder 2000, 141).

## 2.5 Training and development of key competencies

It is necessary to distinguish between the skills of competence. According to Pear skills is defined as the quality and quantity of engine performance (output): Skills Integration is well adapted to muscle performance (performance) (Pear, 1948, 92).

Hans Renold in 1928 defined skills as any combination mental and physical qualities useful for an industry that requires significant training (Winterton, Delamare and Stringfellow 2006, 26). Usually the term skills is used in relation to the level of efficiency, in terms of accuracy and speed in performing certain tasks (skill performance) (Winterton et al 2006, 26).

Competencies generated from social intelligence should introduce this capability through acceptable definition, like one given by Vučić (1982), where she stated that the competence is the ability to grasp the exact relationships between people, or others towards them, understanding processes of humans and their mental state during these procedures, the proper response to the actions of others, as well as taking the necessary initiatives in social relationships (Brković and others, 1996). Regarding the competencies of the individuals the

most influential were Boyatzits and David McClelland, both belong to the American school. They define competences and general competences as individual characteristics that are causally associated with superior operation, which emphasizes a role of the best individual (top performers) and managers. According to Boyatzis (1982) the competences express the characteristics of individuals, which vary from a great performance toward an average or a poor performance. It is related to their motives, skills, confidence and knowledge (Svetlik, Zupan 2009, 218).

Key competences are of no value if an individual does not have the specific knowledge and experience, with which he/she can successfully solve a certain, specific problem.

From a point of view of the knowledge transfer, a degree of personal involvement of the individual affects the transfer of knowledge in this context. Every company should draw up a competence framework in which to choose a system of key competences and level of achievement of the same standard. Thus, the firm starts with the common understanding of the concept of competence.

Svetlik (2005) separated the eight sets of key competences:

1. Social competences in terms of an ability to create good relations with others, work in teams, communities;
2. Proficiency in a mother tongue, written and verbal reports, reading as a rapid acquisition and proper understanding of written information;
3. The ability of divergent thinking, critical adjudications, creativity and problem-solving;
4. Mastering new technologies (especially information and communication technologies) and media;
5. Intercultural competence in terms of knowledge of different cultures as well as proficiency in at least one foreign language;
6. Conducting an independent learning strategy and planning personal developments;
7. The management of numbers, application of mathematical models and analytical thinking
8. Entrepreneurial competences in terms of an ability to organize, plan, manage as well as decision-making capabilities.

Each competency is based on a combination, and the relationship of cognitive and practical skills, knowledge, motivation, value orientation, attitudes, feelings and other types of behavior which as a whole can be used as an efficient management (Svetlik in Pezdirc 2005, 22).

According to Prahalad and Hamel (1994) organizational competencies are a combination of skills and technology organization. They represent the sum of collective learning between the abilities of an individual and the individual organizational units.

A core competency of the organization meets three criteria: 1) To create a value for the customer; 2) To enable differentiation among competitors; 3) To facilitate the expansion (Trott 2012, 201). Prahalad and Hamel (1994) argue that if competences are not utilized, they may lose value over time, because they are dependent on changes in the organization's ability to adequately respond to changes, and pertaining to changes. If you use the key competences they continue to strengthen and create greater value. Key competencies are crucial to the success of any organization, because they represent the characteristics that make this organization a distinctive market (Trott 2012, 202).

**The generic competences of the organization** are necessary for the operation of the organization and for themselves, while not strategically important for any organization. The organization must use a large number of competences if not all, but the competences of the organization differ in character and in time (Thomson and Richardson 1996, 8).

**Work-specific competencies** are associated with specific tasks that we carry out and contribute to successfully perform the job. In this context, we understand that an individual is in a certain role.

With specific organizational competencies the individual adapts its operation, adapting the organizational culture, depending on what kind of role he undertakes. According to these commitments, we can understand the position of the individual within an organization as a whole (New 1996).

Knowledge, skills and abilities are a major factor in innovation, productivity and competitiveness both in the EU and in the rest of the world. According to a report from the European Commission (2008) the rapid pace of change and the continuous development of new technologies mean that Europeans must not only keep their specific skills related to work with a deadline, but also to possess the generic competences that will enable them to manage change.

A German dual system of vocational education has long been viewed as a model for Europe and has a decisive influence on Austria, Hungary and Slovenia. Competencies are implicit in the educational system; the main emphasis was put on the necessary inputs for learning, not

on learning outcomes. A professional competence is rooted in the concept of "Beruf" (usually translated as a profession, but includes crafts tradition of trade and craft guilds), which define the theory of vocational training and linking with pedagogy (Meyer 2002 in Winterton, Delamare and Stringfellow 2006, 52).

In Germany, a special sector of the Social Partner Organization proposed rules for the state to recognize apprenticeship and training profiles and officially regulated jointly with the Federal Government and the Länder government represented by the Ministry of Culture Conference (KMK) adopted 350 profiles training available today. The standard typology of competence shall be decided by the KMK and 2000 appears at the beginning of each new curriculum of vocational education, to develop the professional competencies of action in terms of domains or subject matter competence, personal competence and social competence (Winterton Delamare and Stringfellow 2006, 52). The field of competence describes the willingness and ability on the basis of the knowledge and skills to perform tasks and solve problems and to judge the results in ways that are goal-oriented, appropriate methodological and independently. General cognitive competence (Sachkompetenz), the ability to think and act also sighted way to solve problems is a prerequisite for the development of subject competence (subject competencies, Fachkompetenz) which therefore include both cognitive and functional competence (Winterton et al. 2006, 53).

Personal competencies describe the willingness and ability of an individual to understand, analyze and judge development opportunities, requirements and restrictions in family, work, public life, to develop their skills and to decide on the development of life plans. This includes personal characteristics such as independence, critical skills, confidence, reliability, responsibility, and awareness of responsibilities as well as professional and ethical values. Personal competence therefore includes cognitive and social skills. In some ways self-competence are understood as the ability to act in a moral self-determining human way, including statements about the positive image of themselves and the development of moral reasoning (Winterton et al. 2006, 53).

In Germany a social competence (Sozialkompetenz) describes the willingness and ability to experience and share the relationships and connections, to identify and understand the benefits and tensions, and that there is interaction with others in a rational and conscious way, including the development of social responsibility and solidarity. The balance between personal and social competences is a prerequisite for competences and learning methods

"Methodenkompetenz und Lernkompetenz". Competencies method can be seen as an extension Sachkompetenz and Fachkompetenz arising from the implementation of the strategy and the transversal process of finding and solving problems. This approach is clearly influenced by the idea of "work process knowledge" (Boreham 2002). The competencies for learning are the same meta-competence of "learn how to learn".

# 3 INNOVATION

Technological changes, and their impact on the economic development, as well as social and institutional changes connected with the technological development brought to the surface via a contribution by Joseph Schumpeter (1939, 84). He was a scholar of classical economy, and as other members of that school of thought, he put a man at the forefront giving him a special characteristic, namely, that of entrepreneurship. In the thirties Joseph Schumpeter was first to use "innovation" instead of "technological advancement" (Schumpeter 1939, 84). He was the first to point out a link between innovation and economic growth (Trott 2012, 6). Schumepter (1939, 85) believes that incomplete competition does not slow economical development but to the contrary, it stimulates development. A definition given by Schumpeter states that innovation is a pretty general term; it envelopes an introduction of new products, in other words a qualitative change of an already existing product; a creation of a new production process, and the opening up of new markets; a development of new sources of raw materials and other entries, as well as the introduction of management changes (Schumpeter 1939, 84).

An entrepreneur is a key element of the development of economy in accordance with Schumpeter, his role is not to innovate, instead he applies inventions - he implements the innovations, and by doing so he turns them to innovations (Schumpeter 1939, 86). What motivates an entrepreneur to go through the entire process of introducing innovations (overcoming obstacles existing in the traditional environment)? Profit is a driving force in accordance with Schumpeter (1939, 85), it also anticipates that it will secure a monopolistic position to the entrepreneur and yield additional profit during the time of that monopoly.

The European Union in its Green Paper on Innovation (1995) reported the following definition: Innovation is a renewal or enlargement of the product range and services as well as interconnected markets: an introduction of new production methods, procurement and

distribution, an introduction of management changes, work management and conditions at work as well as abilities of workforce.

In accordance with Damanpoure (1991, 556) innovation can be defined as a new product or service, a new technology of the production process, a new structure and administrative system or a new draft or program.

Many Slovenian authors dealt with innovations, such as Bučar and Stare (2003, 19) adopted the most general form of definition of innovation, specifying that innovation refers to each useful novelty, helping to increase productivity, improve savings, quality of a product and a process of production or services.

Authors Hellriegel, Jackson and Slocum (1999) defined innovation as a process of creating and applying a new idea that could show up in various forms. They insisted that a creation of new products is the main type of innovation, and they named it as a technical innovation.

Process innovation involves the creation of new means of production, sales and/or distribution of products or services. When changes in the organization are considered as "administrative innovation", it refers to creating new forms of organization (i.e. an appearance of groups, learning within the organization, management information systems, merging companies or general hierarchical structures), which better supports the creation, production and distribution of product or service.

For Buitenhuis (1979) - "organizational innovation" is a process that is socially defined for the collective desire and collective processes of problem solving and decision making, and changes in social relations. During the emergence of such innovations, individual creativity plays an important role, as well as a social and scientific system and subsystem of research and development organization. Consequently it produces ideas and knowledge, plus socially defined aspirations, interests and attitudes, some of which are dependent on the use of ideas, knowledge and innovation planning.

A broader determination of innovation represents Teece (1990), which is seen as a search, discovery, development, improvement and adoption of new processes, new products and new organizational structures and procedures. Teece explains corporate innovation which is a cumulative activity, built on the already achieved knowledge and involves uncertainty and risk.

Freeman (1991) argues that the organizational and technical innovations are interconnected inside and outside of innovative companies: technical innovations directly introduce organizational innovations (i.e. changes in the organizational and management structures); and the technical innovations are also often a result of a large-scale process and product innovation. New technologies are shaping the socio-economic environment, and at the same time do their products: it is a kind of "co-determination" between technological innovation and the environment, developing appropriate organizational and institutional framework where innovations are developed.

In the literature, despite a large number of definitions of innovation, we can find various types of an innovation division. Pretnar (1995) defines innovation as a result of the activities of achieving innovation capabilities in the innovation process, and can also be divided into (Pretnar 1995, 7):

- Invention, which relates to any creative solutions, cognition, ideas or achievement,
- Innovation, which refers to the first use of science and technology for economic purposes (economic inventions used) and
- Innovation process, which is a systematic and planned creation of inventions and their subsequent transformation into innovation.

Bučar and Stare (2003) have identified four types of innovation: small or incremental innovations, radical innovations, changes in technological systems and changes of techno-economic paradigm (the technological revolution).

Incremental innovations are those types of innovations which currently occur in each production or service activity. They are less affected by the work of research and development, created with the use of a given technology (learning-by-doing, learning- by-using, learning-by-failing), and they may affect the raising of productivity, but as an individual innovations they do not have a dramatic echo (Bučar and Stare 2003, 26).

The radical innovations are mainly a result of conscious development and research, partially spontaneous, unequally distributed across time and if we look at industrial sectors they represent a potential springboard for a new investment activity (Bučar and Stare 2003, 26). Changes in the technological system are profound changes in technology that affect a range of industries and can contribute to a development of completely new manufacturing or services. They are based on a combination of radical and incremental innovations, both technical and

managerial, which affect a large number of companies (Bučar and Stare 2003, 26).

Changes in the techno-economic paradigm (technological revolution) are in fact its impact on the economy and they not only lead to the emergence of new products and systems in the industry, but also affect all other sectors of the economy. The change of this kind contains clusters of radical and incremental innovations and it influences a number of technological systems (Bučar and Stare 2003, 26).

In the document OECD Oslo Manual (2005, 47), there are also four types of innovation mentioned as follows: production, processing, marketing and organization.

Production innovation covers implementation of a new product or service, or significant improvement in terms of their characteristics and projected usage. Speaking about production innovation we refer to improvements of technical specification, composing parts and material, equipment and other functional features.

Processing innovations deals with implementation of a new, yet significantly improved method of production or delivery and they cover essential changes in technical and accompanying equipment. Their goal is to bring production or delivery expenses down, increase quality and produce significantly better product or services (OECD 2005, 48-49).

Marketing innovations execute new market methods, including essential changes in a form or packaging of the product, way of selling them, promoting or costing management. The innovations are geared towards better fulfillments of clients "needs", opening new markets as well as a better position on the market.

Organizational innovations cover execution of new management methods in the business practice, within the company itself or towards the environment. Their goal is to cut cost of supplies, prove business results by decreasing costs expenses of administration and relevant transactions, and also improve satisfaction of employees, and by doing so ultimately increase the productivity (OECD 2005, 49-51).

Among the Slovenian authors I would like to single out Mulej (2000, 509-511), who classified innovations in three groups as follows: in terms of content, consequences and professional obligations. In terms of content innovations are divided to: programmatic innovation (new business program that is successful and profitable), technological innovation (new characteristics of product and production processes), organizational innovations (useful

novelties in non-production activities and harmonizing various parts of the organization or its processes of any time in the complete and stable entity), managerial (liberal management and new relationship between leader and subordinates etc.) and methodological innovations supporting managerial innovations.

A next innovation mentioned by Mulej (2000) is division brought about by consequences. It includes major innovations rendering available knowledge and equipment obsolete as well as minor innovations solidifying available knowledge and the usefulness of existing equipment, without calling for fresh investments for new equipment or further education.

In the last group Mulej (2000) includes innovation created in the course of professional duty, which includes innovation within one´s official tasks whereby innovators do not legally own their inventions and instead the innovations belong to their management. The second group includes innovations outside the official duty, whereby innovators do have copyrights for their inventions, although they have to first offer those innovations to their management.

Bučar and Stare (2003, 14) in accordance with Stoneman (1995, 3) divided technological changes on three levels by the "linear principle". A first level represents an invention whereby new ideas were born; a second level represents an innovation process whereby ideas are transformed into marketable products and services and a third level represents diffusion whereby new products conquer new potential markets.

If this innovative in product yields profit companies, competition in the market will throw out a similar product. Such activity is called imitation. Re-design of a product to extend the life cycle of innovative products, lower costs and additional revenue, which is a strategic advantage. Standing incremental (small) innovation, represent the added value of the company. They may be insignificant in the level of financial impact on the company, but have additional improvements and elicit greater customer satisfaction with the increase of products and efficient services have a positive impact (Trucker 2008, 23). The essential innovations are of secondary importance both for customers and for the sponsors who invest in the development of products or services. These innovations enable the company to meet its goals; the business grows, to increase participation on the market and to reduce operating costs. New products or services that contribute to changing strategies and lead to a significant increase in revenues and profits are called avoided transaction (breakthrough) innovation.

The breakthrough invention can sometimes lead to breakthroughs at the level of innovation

for many companies. These findings are a giant leap for mankind and the lack of ownership of patents may not provide a "first mover" advantage of one company, but created an entire new industry (Trucker 2008, 25). Examples of such invention are: car, invention of electricity, penicillin, television, Internet, World Wide Web (www) and many other breakthrough innovations.

Radical innovations are those that require your company to develop a completely new business or product lines based on new ideas or technologies or reduce costs and to transform the economy and changing business sponsorship and disrupt the entire industry. It should be noted that not all radical innovations become breakthrough innovations, and not all breakthrough innovations are radical. The radical innovations that have become pervasive provide customers with completely new ways of solving problems and meeting their needs, and in some cases they create new needs. Radical innovations require that the company sponsor is the first mover, or at least fast follower changes.

Radical innovation can be stimulated by a particular effort as opposed to waiting for the happy circumstance arises. Time for this kind of innovation usually takes ten or more years to develop this innovation into a commercial product, and additional time to build the market. Radical ideas should have different processes and financial resources to lead their development. Radical ideas often require multiple routes that are visible from idea to implementation (Trucker 2008, 27). Lack of such innovations is that it takes over 15 to 25 years for their payment; unfortunately many of the ideas that become breakthrough are not so radical or risky at this question.

### 3.1 Approaches to innovations

Innovations or speaking in modern terms, clever usage of advance knowledge is considered to be one of the key elements of the economic development in a knowledge-led society. We can distinguish three different approaches to innovation and local development, as follows: sectorial and functional approach; structural approach and cognitive approach, according to Capello (2011, 107). First notion of the *sectorial approach* explains capacities of local innovations. It emphasizes the presence of a "science-based" or high-tech sector; and regions where these sectors are defined as the scientific regions that lead the transformation of the economy and economic growth (Capello 2011, 108).

"Scientific" regions are the basis for large and very well-known research institutions, where deep connections are established between these institutions and industrial plants; however these links have not been often visible (Capello 2011, 109). A functional-based model emphasizes the importance of interaction and horizontal functions of research and development and higher education. The tendency of high-technology to be grouped in clusters valleys, corridors, and high-tech districts was the early empirical evidence demonstrated by the Marshall Plan. Concentrated locations facilitate the exploitation of technological and scientific knowledge developed in science centers and universities; it provides easier access to knowledge and not quite codified knowledge that is necessary for imitation and reverse engineering, as it allows access to skilled labor and advanced services (Capello 2011, 109). Furthermore, Capello (2011, 109) argues that the interest in dynamic accumulation economy grew in the recent period (1980). It has shown that innovation is concentrated in the central and metropolitan regions, in fact, using input indicators, for example by investing in research and development and output indicators such as the number of patents from innovative activities. In both sector-based and functionally based approach, space is treated very abstractly, indirectly and in a stylized way: the concentration and accumulation of the major R&D funds are the eligible starting point for empirical analysis, while the process of dissemination of knowledge to analyze in terms of pure probability function, which decreases with physical distance (Capello 2011, 110).

The main idea of the *structural approach* (Crescenzi, Rodriguez and Storper, 2007) is that certain conditions are structurally grounded in local systems, given the speed with which each society adopts innovation and investigation. Every nation and the region have a unique 'social filter' that sustains innovation. According to Crescenzi it includes the elements identified in the educational system, lifelong learning, sectorial composition, using sources (like unemployment), and demography which practically refers to migration. In the most innovative places, migration is expected to update the adequate knowledge, skills and competences at the same level with technological development of border areas (Cooke 2011, 111). In this approach, innovation is a state of knowledge, translated instantly and easily commercialized in innovation due to the presence of structural elements. Productivity is at the center of analysis approach, interests lie in understanding the different degrees of productivity in innovative activities developed by the regional system. Innovation productivity implies a high human capital, population density, taxes and industrial structure (Cooke 2011, 111). In this approach, the space is perceived in two ways, first, the area was seen as a vehicle that

increases the accumulation of the economy, allowing the sharing mechanisms, switching and learning. The other way is that space is seen as a conduit of knowledge spillover activities in the sector for research and development, subject to strong and visible effects of degradation in distance (Capello 2011, 111).

*Cognitive approach* is quite different from the previous two approaches; it refers to the ability to transform information into innovation and invention, supporting productivity growth through interaction or cooperation of the market. This approach is focused mainly on regional and local levels in the construction of knowledge through cooperative learning process, backed up by spatial proximity, by Capello (2011, 112). That knowledge is connected in networks (including distant selective connections), interaction, creativity and ability to re-combine (Cooke 2011, 112). In this approach, knowledge flows through the channels of information, studying and it is apparently enshrined in the territorial structure. This approach requires the enormous mobility of professionals and experts between companies, but also internally to the local labor market defined by the area of the city where the maximum mobility, and intensive cooperative ties between local stakeholders, and in particular the customer-supplier relationship and production, design, research and knowledge creation in the end (Cooke 2011, 113). The role of space becomes clearer: abstract space becomes a real territory, relational space where the functional and hierarchical, economic and social interactions take place and they are based in the geographical area.

The local milieu is a territory identified by geographical proximity (aggregate economy, district economy) and cognitive close proximity (division code of conduct, common culture, mutual trust and a sense of belonging), which provides socio-economic and geographical background on which the collective learning process can be incorporated (Capello 2011, 113). This "cognitive machine" is characterized by increased interaction and cooperation, reduced uncertainty (especially as it relates to the behavior of competitors and partners) - by reducing the information asymmetry (therefore reduction of mutual suspicion between the partners) - and reduces the possibility of opportunistic behavior under the threat of social sanctions. All these elements were confirmed by many regional economic schools (Camagni 2004).

Innovation and creativity are seen as the basis for the European economic and social model. In recent years, the scope of the concept of creativity and innovation is expanded; the production of knowledge and innovation is no longer in the hands of a few, but the collaborative process of creating, using and evaluating knowledge. It is a process that requires

complete participation of all involved parties. According to the report by the European Commission (2008) companies are required to leave the traditional hierarchy in exchange for teams and together for joint work in which each member should have the big picture, motivation and skills that contribute to communication.

Innovation is a term of Latin origin that represents something new and it is connected with the technical and technological production, yet it is not like that for a long time. Many authors define innovation as an idea or behavior that is new to the organization and it lies in the knowledge that an employee possesses. This is certainly a good combination, one that thrives in the world of real production, and innovation is usually born in the section on research and development. Why do we say that innovation could also be open? If a firm is isolated and closed, then there is no innovation. On the other hand open firms are ready to accept new knowledge. Only a few companies in the world are so powerful that they can only use their knowledge sources (Almeida, Phene and Grant 2006, 357). In the study of 17 (R&D) laboratories Allen and Cohen (1969) found that "unpaid external consultants" and informal contacts with government institutions and universities are important sources of research and development of knowledge (Almeida, Phene and Grant 2006, 358).

The study by Mueller (1969) for the period between 1920 and 1950 executed for the Du Pont Institute concludes that the main knowledge and innovation came from outside.

A recent research also shows that the knowledge that exists outside the boundaries is a "key" to the success of the firm (Dyer and Singh in Almeida 2006, 358). The use of wider knowledge affects the company as well as increases flexibility and dynamic environment. Another study was done at Yale University in 1995 where 650 R&D managers were involved, and it has shown that one of the most important channels for learning in the R&D sections in many industries was actually external knowledge.

Then we have a question of how companies can manage knowledge effectively and accurately. In order to do so we should incorporate three processes such as: research, transfer and integration of knowledge (Almeida, Phenom and Grant 2006, 358).

### 3.2 Concept of open innovation

Innovation has been described as a creative and information process, which originates from

social interaction. Chesbrough (2003) adopted the strategy of the business perspective, presenting convincing arguments to the process of innovation switched from one closed system within the company to a new model of open system, including a wide range of actors distributed up and down the chain of suppliers. Chesbrough pointed out to a new economy based on knowledge that forms the concept of open innovation (Trott 2012, 25).

In practical terms that is use of an inexpensive and instant information flow that encourages greater connections between companies. From these relationships and supply chains, companies should ensure that they are able to fully adopt and exploit their ideas (Trott 2011, 25). Authors such as Thomke (2003), Schrang (2000) and Dodgston and others (2005) emphasized the importance of learning through experimentation. It is very similar to Nonaka's work in 1990. He emphasized the importance of learning by doing in his book "Knowledge creates a company" (Nonaka 1991, 2). Dodgston, Gann and Salter (2005, 1) emphasize that significant changes appeared at all levels of the innovation process, forcing us to re-conceptualize the process of innovation, particularly emphasizing three areas that have experienced the most significant changes pertaining to the new technologies. These changes are: technologies that produce services, technologies producing communication and technologies dealing with production. For example, mobile phone, e-mail, web pages are obvious examples of how people communicate interactively and how information flow outside the company (Dodgston, Gann and Salter 2005, 2). When all of these changes multiply with changes in production and operating technologies, it consequently makes it possible to rapidly develop prototypes and flexible production with reduced costs. The process innovation seems to be going through a very significant change (Dogston et al. 2005, Chesbrough 2003).

These authors point out that the models of innovation must take into account new technologies that enable immediate and extensive interaction with many associates throughout the process- from a conception phase up to the final sales.

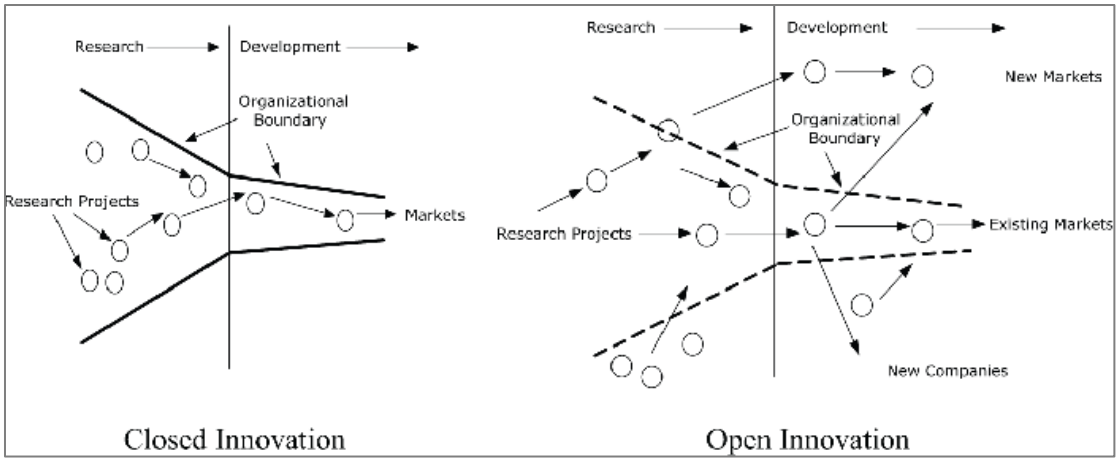
There is a correlation between the innovation process and the external and internal environment of the company. That correlation examines the flow of knowledge within the innovation process. That also illustrates how open innovation paradigm was built on previous research, and it was presented as an option for the management of innovation. This henceforth confirms that the access to and use of the flow of knowledge is indeed a fundamental part of the innovation process (Trott 2011, 348).

In contrast to a traditional model, where a direction of the innovation process moves primarily from the organizations towards the outside, due to the connection with the environment and open model, there is also another direction of movement and that is the movement from the environment towards the company. The processes in open models are more complex and dynamic, and they depart in more than one direction, while the closed innovation model is linear and rigid (Gassmann and Enkel, 2004).

In open innovation models, bilateral exchange of knowledge is encouraged. That is manifested through internal use of external knowledge (inbound open innovation) and external use of internal knowledge (outbound open innovation) as reflected in research, retention and utilization of knowledge that can be maintained within or outside the limits enterprises (Lichtenthaler and Lichtenhäler 2009).

Figure 1 show the model of closed and open innovation, where the circles represent ideas all the way from an original idea to innovation. Organizations with a closed innovation model are using exclusively technology, knowledge and resources of the enterprise itself, and that is why the boundaries of enterprises are shown with a full line, which indicates the closure and disconnection with the environment. Ideas enter the left side of the funnel and out to the right. In the funnel there are less ideas coming in and on their way towards execution a lot of them are simply wasted. The reason is that the company only executes those ideas in order to meet the current needs in the existing market in the most efficient way. In the case that implemented innovations at a given time do not correspond to the market, the organization decides to keep them for a later and more convenient time (Chesbrough 2008, 2).

**Figure 3.1: Picture of knowledge in open and closed innovation**




*Source: Chesbrough (2003a, 44).*

The boundaries of the company in the model of open innovation are presented with a dotted line, which represents a permeable membrane, which allows the exchange of ideas, knowledge, technology, licenses, etc. between the company and its environment. The resources come from the internal and external environment, which is a significant advantage as they can come and go from the companies at different stages of the innovation process (Chesbrough 2003a, 43). A field of knowledge is certainly different now, than in the past. The public scientific data, on-line journals and articles, combined with minimal cost of Internet use, and a high level of data transmission provide access to a wealth of knowledge that was far more expensive and longer lasting in the early nineties (Chesbrough 2003a, 44).

In the closed innovation model, there is resistance to the ideas and knowledge that comes from outside the company. This syndrome is called a "not invented here" syndrome, however, when talking about the model of open innovation, the relationship is just the opposite. It is a positive one and it is proudly exclaimed that something is found elsewhere. Companies with an open innovation model indications and use external sources which are faster due to greater specialization, cheaper and more efficient than using only internal development, which usually requires much more time before tangible results may occur (Chesbrough 2003a, 49).

Chesbrough (2003b.) in the table below (see tab. 2.1) presented six points underlying the closed innovation model. It should be noted that a dichotomy between the closed and open innovation exists in theory, but not in practice. Chesbrough was very successful in popularizing the concept of transfer of technology and the need to share and exchange knowledge (Trott 2011, 349).

**Table 3.1: Comparison of the principles of closed and open innovation**

| Principals of closed innovation | Principles of open innovation |
|---|---|
| Smart people in our area work for us. | Not all smart people work for us, so we have to find and take into consideration knowledge and expertise of other smart individuals outside of our company. |
| In order to benefit from the research and development we have to discover, develop, produce, and deliver ourselves. | External research and development can create a certain value; internal research and development can create only a part of this. |
| If we find it ourselves, we will be the first on the market. | We do not need to encourage research in order to benefit from it. |
| If we are the first to commercialize innovation, we won | To build a better business model is better than if we were first on the market. |
| If we create the greatest number of the best ideas in the industry, we won. | If we have the best use of internal and external ideas, we won |
| We need to control our intellectual property rights (Intellectual property) that our competition does not profit from our ideas. | We will benefit from other 'using our intellectual property,' and we also have to buy from others, if that improves our business model. |

*Source: Chesbrough, H (2003b).*

If we stick to the principle of closed innovation (see tab. 2.1) it means that the company must create everything, starting from generating ideas, developing and marketing products or services, and of course distribution funding. This means that the innovation project can get into the innovation process at the very beginning, it develops only with the use of its resources and capabilities, and that can only come from the process of marketing through the distribution channel of their own companies. In cases where projects are rejected, there are collected and stored in a database. It follows that these ideas, technologies or projects remain unused unless innovative team of the company requires a different approach (Chesbrough 2003b, 36).

The open innovation models require new systems and processes, which are responsible for

processing a whole range of responses within the specific time periods. We can define open innovation as the intended use of incoming and outcoming knowledge with the aim of improving internal innovation and expanding markets for external use of innovation (Chesbrough, Vanhaverbeke and West, 2006, 1).

Open innovation can be seen as an attempt of the company to benefit from external knowledge without having to make a large internal investment in long-term studies, however, the company cannot fully rely on external sources of knowledge if they want to be different from competitors (Cooke 2011, 402).

Chesbrough (2008, 34) identifies four factors of "erosion" that led the closed innovation model to desapearing. These are: increasing the availability and mobility of skilled workers, the second is the risk capital market, then, the outside option for ideas that sit on the shelves (not used) and finally the increased possibility of external suppliers.

The first factor is the erosion associated with hyper-production of highly skilled workers after World War II, and it happened with highly educated and graduate students from the university. Another trend in the labor market is to increase the mobility of these highly skilled workers, spreading the knowledge they have obtained from their R&D organizations, suppliers, customers, partners, universities, start-up companies, consultants and other "third" parties.

With widely spread information, a new company may obtain useful knowledge, which was not possible in the past. The company can make a profit from hiring consultants from other companies, without paying any compensation to the providing companies.

The second factor of the erosion is risk capital market where people from large companies migrated to small start-up companies. Capabilities of companies to attract other talented staff to the new venture were also impaired with a lack of adequate capital to justify the risk of leaving well-capitalized company for an unknown start-up company. While large companies with huge investments in R&D were not delighted when some of their employees opted to leave the company, and are furthermore not concerned at all regarding how the absence of these employees would reflect upon their future business perspectives (Chesbrough 2008, 37).

If the internal development of the company is not ready to use results of a new research, it cannot be simply concluded that the result thereof will always remain on the shelf, readily available whenever the development group decided to use it. Customers will not wait

indefinitely for better products, and competitors will not make them wait for those products. Therefore, disappointed workers have other ways to commercialize their ideas in new markets, for which the original company is not suitable (Chesbrough 2008, 39). Thanks to a confluence of many factors already mentioned, such as the expansion of the university and universities enrollments, the availability of well-trained workers to companies of all sizes, and the increased presence of venture capital, the external supply base is much more intensively developed in many industries today than it was after the World War II. These suppliers offerings are now often of equal or superior quality to what a company can achieve internally (Chesbrough 2008, 39).

These factors have contributed to the erosion of closed innovation paradigm; they lost a valuable connection between development and research. Therefore, ideas cannot be placed on the shelves, because they will eventually expire, and will go to the wider environment. A company that fails to use its technology can see upgraded versions of their own ideas explored and developed by other companies (Chesbrough 2008, 40). Companies can find vital knowledge among the customers, suppliers, universities, national laboratories, consortia, consultants and even start-up companies. Companies must organize themselves to take advantage of these distributions, rather than ignore them and keep doing their internal R&D agenda.

Chesbrough (2008) concludes that companies cannot expect to store their technology as long as the business itself is not utilizing them. If the company does not vigorously use those ideas, there is a possibility of losing them and they could appear outside the organization.

While Chesbrough (2003, 2006) points to the rich resources advantages "paradigm of open innovation", there are many R&D and innovation managers who will argue that the so-called paradigm represents a little more than re-arranged concepts of already existing findings known 30 years ago (Trott 2011, 349). According to Dahlander and Gann (2010) (in the Trott 2011, 349) openness represents the manifestation of two input process: the origin and acquisition of technology, and two output processes of discovery and sales technology.

Today's business reality is not based purely on open innovation. The companies also invest in open and closed innovation activities (Enkel, Gassmann, Chesbrough 2009, 312).

According to Enkel (2009) excessive transparency (openness) could negatively affect the long-term success of the innovation process in the company, because it can lead to loss of

control and core competencies. Access to a closed innovation cannot serve the growing demands for shortened innovation cycles and shortening the time to enter the market. The future lies in an appropriately balanced approach to open innovation, where the company or institutions use every available tool to create successful products and services faster than the competitors, and at the same time encourages the construction of key competences and protection of their intellectual property (Enkell, Gassmann, Chesbrough 2009, 312).

According to the same authors, this demand creates an increasing urge to identify the cause and effect of the open and closed innovation activities, finding the right collaborators and integration mechanisms and exploring non-economic approaches to enriching companies' portfolio.

I shall present the results of research conducted in 2008 (Gassmann and Enkel) in 107 companies, comparable with the European SMS and large enterprises, showing the extent of a risk of investing in innovation and the obstacles that appear in the entire investment process.

The most frequent risks are a loss of knowledge in 48 % of cases, higher costs of coordination, also 48 %, followed by a loss of control and greater complexity of 41 %, how to reach a right partner, 43 % (described as an internal barrier), and how to incorporate innovation in the daily school routine – 36 %, and also a lack of time for innovation as well as a lack of finances (Enkel, Gassmann and Chesbrough 2009, 312).

Three main processes can be distinguished in open innovation: from-outside to inside (outside-in), from inside to outside (inside-out) and the combined process (Enkel, Gassmann and Chesbrough 2009, 312).

Research conducted in 2008 by Enkel and Gassmannn with 144 companies, examining the process from outside to inside (outside-in), discovered that the sources of knowledge are mostly clients (78 %), followed by suppliers (61 %) and competitors (49 %), as well as commercial and public research institutions (21 %). A surprising percentage of other sources (65 %) came from non-clients, not-suppliers and partners from the other industries. It is a new form of integration or custom integration community of consumers as "crowdsourcing" (Howe in Enkel and others 2009, 312).

Companies that established the inside-out process (Enkel and Gassmann 2008) focused upon outsourcing knowledge and innovations (externalization) in order to place ideas on the market faster than they would do if they have to go through internal development. A decision to shift

a place of exploitations of ideas outside the company means that the idea has to be licensed; alternatively it could be done by multiplying technology via transferring ideas to other companies. In the research (Enkel and Gassmann 2008) it turned out that 43 % of companies do have licenses within the company (in-licensing policy in place), while 36 % use an out-license policy for external commercialization of their technologies (Enkel, Gassmann and Chesbrough 2009, 303).

In the third example (Enkel and Gassmann, 2008) companies implementing a combined process do mix the outside-in process (getting external knowledge) with the inside-out process (placing ideas directly on the market) and by doing so, jointly develop and commercialize innovations.

The results of the study (Enkel and Gassmann, 2008) showed that companies integrate external knowledge in 35 % of all R&D projects within the big projects. In highly developed high tech industries (IT, electronics and electrics) they can reach up to 50 % of joint R&D within the company. In a category of slow-developing industries (printing, light industries, wood and leader) a number of common projects is 20 % or less. The study (Enkel and Gassmann, 2008) discovered that companies using networking select and use their external partners in various ways. It follows that 83 % was primarily linked with a non - competitive market and technological leaders, 79 % of world-class universities, while 61 % are local companies (Enkel, Gassmann and Chesbrough 2009, 313).

In the university literature (Huston and Sakkab, 2006), Procter and Gamble case study is often presented as the most adequate example of an open innovation. Here is a single example of their approach towards open innovation: they launched a new line Pringles chips (2004) with pictures and words printed on each piece of chips. Previously they needed two years from the idea of launching until execution. With a new radical approach to innovations, printed chips were launched for less than a year. The idea was born at one of the meetings when they were throwing ideas to create the funniest snacks possible. Somebody suggested printing pop art images on Pringles. An excellent idea, but how to do so? They quickly realize that printing can only take place after the roasting of chips. In accordance with their tradition, a lot of time and money was needed to be invested to develop a process that could result in the described products.

A first step would be to connect with a printing company, which would create a process and then a complex situation would emerge regarding copyrights for a new ink-jet chips printer.

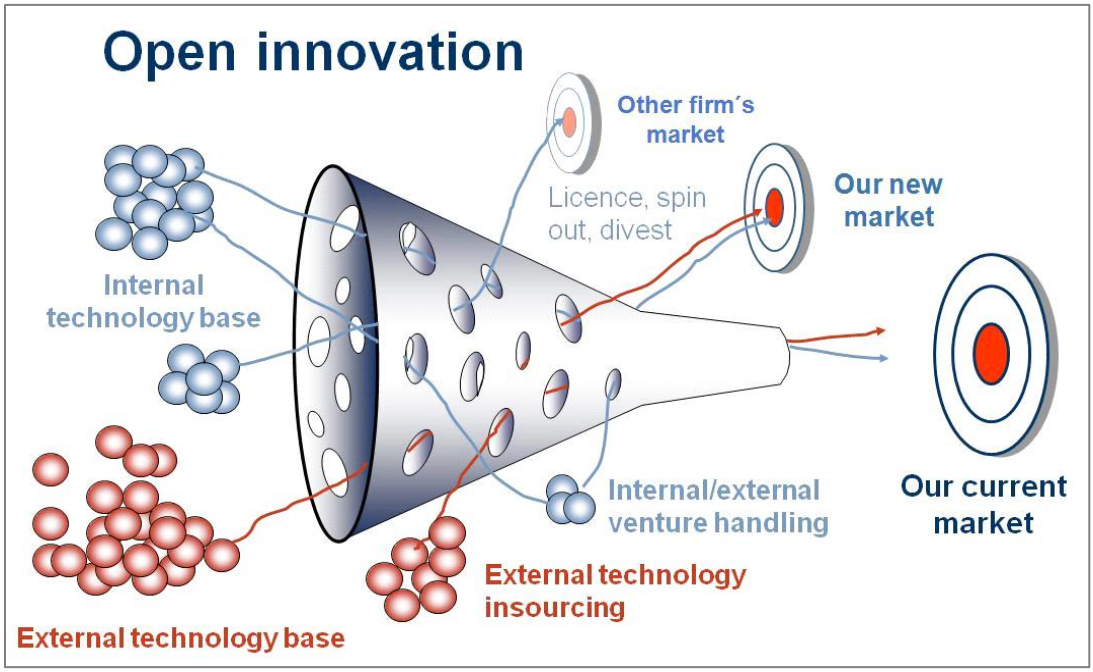
Instead of creating a whole technology they changed the approach. After creating a short description of the problem they asked the individuals and institutions within the global network to find out whether a solution existed any were else. Through the European network they discovered a small bakery in Italy (Bologna) - led by the university professor which produced bakery equipment. The professor invented an ink jet method of printing edible pictures on cakes, and that helped them tremendously to resolve their problem. This innovation helped North American Pringles to achieve double growth within two years.

This new method helped them to search for useful innovation in small and medium enterprises, where individuals were often getting upset about intellectual property. Universities and government laboratories got interested in creating industrial partnerships, and they wanted to profit financially from their research. Internet, of course, allowed a global access to talent markets. They knew that the best innovations in P&G come from ideas within their own connections and jobs. They, however, knew that external links could also lead to highly profitable innovations.

A final result was that half of P&G products come from their own laboratories, while the other half comes from elsewhere. An entire global network of the company consists of 200 scientists working for them as well as thousands of engineers; however the outside world requires massive operational changes.

Therefore the company´s attitude of resisting a fact that "it is not discovered here" changed to "proudly discovered elsewhere". That means they have changed the attitude towards functioning R&D department of 7.500 employees and how they look at 7.500 people inside its own global network plus 1.5 million outsiders, with very porous boundaries between them. By doing so P&G created an innovative model called "*connect and develop*". With a very clear understanding what consumers need, we can identify promising ideas worldwide, and require our own R&D creation marketing and supply, in order to have faster, cheaper and better products. This model functions at present in such a way that more than 35 % of new products possess elements coming from the outside of P&G (Huston and Sakkab, 2006).

**Figure 3.2: Schematic of open innovation**

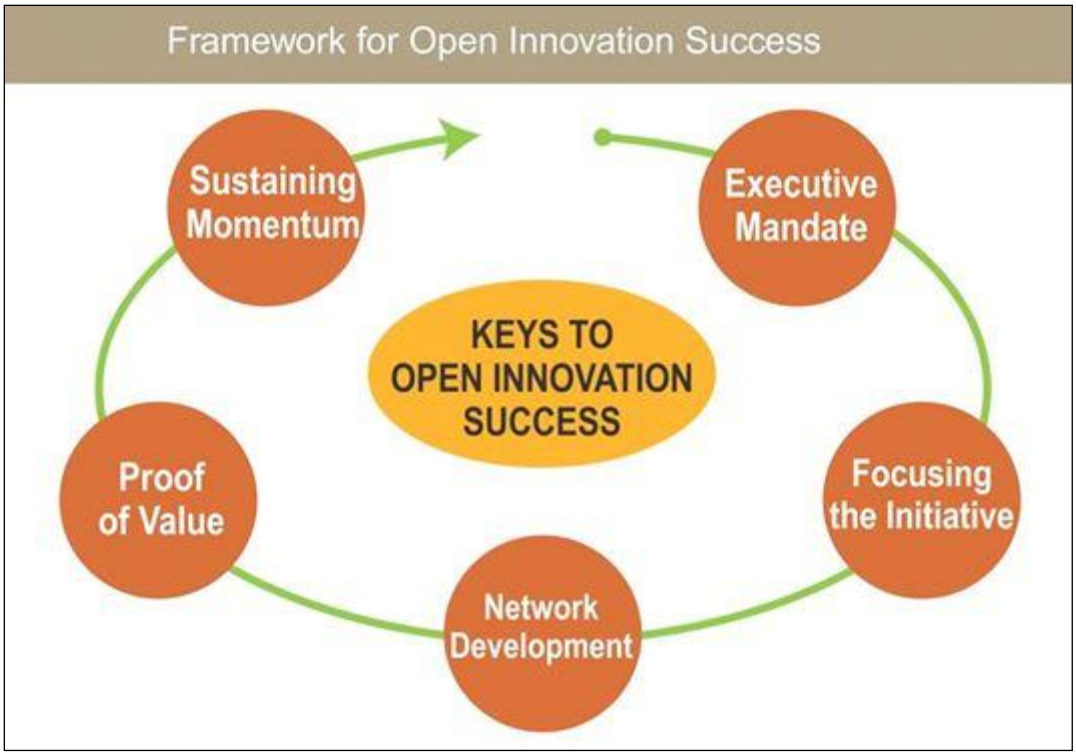



*Source: Chesbrough (2006).*

### 3.3 Factors of the open innovation

The Forrester's study conducted in late 2011 is based on a survey of 229 respondents surveyed, involving the United States, Germany and the United Kingdom, recorded the five key factors on the road to successful open innovation (see Figure nr. 2.3).

**Figure 3.3: Key factor of open innovation**




*Source: Forrester's report commissioned by InnoCentive (2012).*

From the research we can see that executives or leaders are the primary drivers of innovation strategy. A good leader is the first key to success in an open innovation model. It also shows that the leader will support innovation quite differently, and therefore cross-functional coordination and cooperation (particularly between sections for research and development and operations) are indeed fundamental for the success of open innovation.

In the Forester's survey initiative network of external partners, program ideas and problem solving network have been identified as the most characteristic point in the program open innovation, according to the respondents (2012, 3). The study also reveals a need for organizations to have better conductivity of external resources and talents, not only to solve challenges in an innovative and cost-effective new ways, but also to make use of the mechanism and potential of open innovation to promote internal cooperation of individuals and groups.

The third factor of success is to develop a network of partners. Thus, it is also essential to view open innovation through an aspect of multiple dimensionality. A contribution to diversity and a wide range of knowledge are the main aspects when selecting suppliers and customers. The fourth factor of success is proof of value. It is essential for the establishment

of the facility and for the provision and maintenance of assets. Such inter-functional alignment and collaboration keep the long-term momentum of open innovation (InnoCentive Forrester's Report 2012, 3).

The fifth factor is the sustainable momentum that involves cross-functional cooperation of all units of the company including non-R&D sector, because the process of open innovation is exclusively "team sport".

Companies are ruthless in searching for this external knowledge and have developed a new tool for the acquisition, interpretation, preservation and access to knowledge. They approached that search with new business developments. It is done through forward or backward integration, through the phases in the product development cycle and across functions within the company.

This integration can create more value for their clients or to supplement the production of specific services that precede or follow a production of the product (Warren and Susman, 2010, 18).

**Table 3.2: Key factors for open innovation**

| Primary category | Key factors of success |
|---|---|
| **Internal** | An intellectual property (management), knowledge management, IT applications, maturity, management, culture, human resource practice |
| **External** | Proximity of customers, supply chain and competitive knowledge, proactive engagement with the environment for the acquisition of technology, knowledge, etc. |
| **Bridging** | Creative business model, partnerships, integration through product development cycle phase, balancing between internal and external factors. |

*Source: Warren and Susman (2010, 5).*

***Internal factors:***

This raises a question whether intellectual property (IP), primarily patents and trade secrets (to a small extent, trademarks, service marks and copyrights) are considered to be key to the success of the company. It was investigated how the intellectual property embedded in the innovation process, if there is an IP formal plan and if so, how it is constructed, and what the approach of using intellectual property actually is. Successful innovative multinational companies have a formal plan for the management of intellectual property, with a strong

emphasis on patents, to almost complete reliance on trade secrets, including this factor and a level of research and development within the company (Warren and Suzman 2010, 19).

Innovative IT applications are industrial products which are often embedded in the software or content - they interact with their own software on the local (intranet) or more frequently, as the internet host. Corporate existing software can be a means to provide the ability to customize the product or service level. Innovative IT applications within the business models create a significant competitive advantage for companies (Warren and Suzman 2010, 19).

The age of enterprises (maturity) - this factor is introduced to reflect the accumulated experience and social capital and it is significant for a long-term competitiveness.

Management - ownership can influence a scope and style of decision-making, management, culture focus, etc. It is believed that private companies (owned by the family or private non-family owned) are ready to make decisions with long-term consequences and how to settle accounts, unlike public companies.

The fluctuation of employees - uses the fluctuation of employees as an indicator of an open and inclusive culture, the ability to retain and exploit tacit knowledge, and lack of leakage of intellectual property.

Program division of profits - this may affect the ability to encourage and exploit innovation and can be an indicator that the human recourses be organized so that they have a low hierarchy in a team (Warren and Suzman 2010, 19).

***External factors:***

Closeness to customers - it often refers to an understanding of customer needs - explicit as well as implicit. Frequent interactions with customers are generally regarded as stimulus for innovation (Warren and Suzman 2010, 19).

A focus on market refers to a product or service and not to a geographical sector; Table 2.2 is indicates an active engagement with the environment for acquiring technology. This raises the question whether a narrow focus on the market is affected positively or negatively in relation to the successful execution of innovation? It turned out to be a better strategy to follow the path of innovation rather than to follow the market (Warren and Suzman 2010, 20).

A geographic focus – as such it is interested in whether a company can be successful with a limited range on the market or should it operate globally. The risk of entry into new markets - this factor refers to the willingness of companies to enter new markets unrelated, regardless of whether they be emerging or well established and differ significantly from those that the company already serves. The aggressiveness of marketing relates to market positioning and communication skills of companies in introducing new products and services. This is a reflection of the innovative capacity of the company.

"High" aggressiveness refers to a company that is driven by marketing, "medium" aggressiveness means a focused low profile "peer-to-peer" marketing and "low" indicates that aggressive sales come exclusively from the reputation and recommendations (Warren and Suzman 2010, 20).

***Bridging Factors:***

Technological integration - this factor relates particularly to the processes that combines internally developed technology and the access to external technologies from independent third parties, partners, customers or suppliers as part of an integrated plan (Warren and Suzman 2010, 20).

Service and production - starting from a fact that production is no longer sufficient for the sustainable competitiveness and that every successful company must have in its business model and content services. We see that a trend more in services than in manufacturing models, along with adapting to the needs of individual customers (Warren and Suzman 2010, 20).

Competitive advantage - explores whether this is derived from product quality, time to market, technological innovation, content, services and customer satisfaction, or intellectual property rights and other (Warren and Suzman 2010, 20).

Partner relationship - relations between companies are important for the continuation of the successful partnership between companies where there is ambivalence amongst them. Also, as time passes products can make a huge profit on international markets which are easily accessible. New business models may be required to meet the fleeting "windows of opportunity". A geographical closeness plays little to no role in the formation of such

relations (Warren and Suzman 2010, 20).

Regarding IP management, successful companies aggressively protect the proprietary knowledge that they have developed through a fortress of patents or intense secrecy. Some parts of their knowledge are so deeply rooted in organizational routines, it is difficult to imitate, and it will take years to develop the same technology by the competitors (Warren and Suzman 2010, 18).

### 3.4 Networking

The use of the term network has become very popular. For many it is a new form of organization offering a kind of "virtual organization". Some networks are described as a "web" or "clusters"; others believe that it is nothing more than a new label with a solid range between suppliers and markets (Trott 2012, 243). Day and Shoemaker (2000) consider that some networks are interconnected and function as poorly related companies that operate relatively autonomously, but are not less engaged in mutual monitoring and controlling one another.

Economists traditionally see companies as isolated and small rational players. According to this approach, a manner in which companies cooperate is only through market driven by a price. For a long time economists have not thought about a fact that in parallel with the transactions in the market, companies can be embedded networks, with social and personal relationships or ties bound to affect their economic behavior (Giuliani 2011, 156). According to Granovetter (1985, 504), they implicitly accept the assumption that 'market processes' are not suitable objects for sociological studies because this social ties play only fictive and disruptive role, and not a leading role in the modern society. Organizational sociologists have emphasized the limitations of economic theory and brought an idea that in modern economies, companies are not isolated participants, nor are connected only through market transactions. On the contrary, they are built into the system of social transactions, which provides a form of organization of production, distribution and consumption.

Granovetter (1985) continues to question the validity, dichotomies, hierarchy and market, arguing that opportunism can be pervasive within the same corporation, and can be kept at bay in the market, if the companies are embedded in a network of social relations that monitors and sanctions opportunistic behavior and frauds or violations.

Transaction costs can be kept at minimum, when the social network is built within the companies (Gulati, 1995). Informal social networks are made up by innovators, scientists, researchers, managers, technicians and other participants in the process of innovation that are building intra or inter network (Giuliani 2011, 157).

Innovation is widely recognized as a social process, including the interaction of alliances and collaboration with different stakeholders, and it is rarely a result of individual attempts of a company (Freeman 1991). Literature refers to accumulation of knowledge in clusters, regional innovation systems or technological districts. This accumulation indicates the synergy among a group of internally connected technologically-led companies (including suppliers, customers and competitors), highly qualified work (often engineers), public institutions (universities, research centers, specialized services for procurement and associations of employees), which are specialized in a few related activities in areas that represent specific regions or urban settlements. According to Michael Porter (1988) clusters are critical masses in one place of linked industries and institutions - from suppliers to universities to government agencies - who enjoy unusual competitive success in a particular field, for example: Silicon Valley, Hollywood (Trott 2012, 242). A geographical, cultural and institutional proximity provides companies with special access, closer contacts, better information, powerful incentives, and other challenges that are difficult to touch from a distance. Competitive advantage lies more in local issues such as knowledge, relationships and motivations and distant rivals cannot repeat it (Trott 2012, 243).

The strategic alliance is an agreement between two or more partners to share knowledge and resources, all of which would benefit all parties involved (Trott 2012, 234). The weak point in alliances is a lack of resources, thoughts on technology research and development, a cost of building sustainable technical expertise, and specialized equipment will rise dramatically, even in the largest corporations that have traditionally been dominant in some areas.

They cannot maintain itself due to a lack of adequate technical capabilities to adopt the rapid pace of market dynamics (Trott 2012, 234). Furthermore Slowinski et al. (1996) concluded that the alliances provides an opportunity to both large and small high-technology companies to use and share their resources in order to expand into new markets (Trott 2012, 234). For example in Europe countries have a long history in the development of scientific inventions, but they suffer from a poor understanding of the market and often do not utilize the full potential that comes from their inventions. American companies have the ability to earn

profits from the market, but they do not improve continuously in price and quality. While the Japanese and Asian firms have extensive capabilities in the field of quality and production efficiency (Trott 2012, 238).

Alliance may appear in two forms: intra-industry and inter-industry. For example, the three major car companies in the US have formed an alliance to develop technology for electric car; it is an example of intra-industry alliances (Trott 2012, 239). In the UK pharmaceutical giant GlaxoSmithKline has formed a lot of inter-industry alliances with a wide range of companies from different industries, including companies such as Matsushita, Canon, Fuji, Apple (Trott 2012, 239).

There are eight basic types of strategic alliances (Gulati, 1995): licensing; links suppliers; outsourcing; joint venture; Co-operation (no joint venture); R&D consortium; industrial clusters and innovation networks (Trott 2012, 239).

Licensing is the beginning of some types of cooperation, there is usually a challenging element of learning and refers to the user license until the person who sold the license has the role of a "teacher" (Trott 2012, 239). Many companies do establish close links with their suppliers, which may evolve into an informal alliance. It is usually based on the reduction of production costs, reducing costs for research and development based on information from suppliers on the use of their products in the customer application. Improved flow of material resources caused by a decrease in inventories due to changes in delivery frequency and a lot sizes. Reduce the administration costs through better integrated information system performance (Trott 2012, 240). Outsourcing involves a transfer or exchange of management control and decision making - or a business function of an external supplier, which includes a two-way exchange of information, coordination and trust between the outsourcer and its client (Trott 2012, 241).

Joint venture (joint venture) is usually a separate legal entity with its partners in the alliance, it is common shareholders. An example is the Sony-Ericsson joint venture by Sony from Japan and Ericsson of Sweden in the design, manufacture and distribution of mobile phones, while previously both companies have failed to market the phone (Trott 2012, 241). Collaboration in the non-joint ventures is characterized by the absence of a legal agreement. Many university departments work very closely with local companies in a lot of different research projects where there is mutual interest (Trott 2012, 241). Research and Development Consortium describes the situation where a number of companies are coming together to take

over what is offered to them by the activity at a high level (Trott 2012, 241).

Storper (2000) has used the term "teritorization" to describe local network including institutions, culture, industrial structure and the dominant internal organization of companies. There is a strong correlation between the businesses that are spatially concentrated so the dynamics and local spread of knowledge and innovation depends on the geographical area limitations. Transfer of knowledge depends on the relationship between the institutions in which knowledge is produced (universities, R&D sector, research centers) and receiver or local firms. This clearly leads to the conclusion that the production of knowledge is primarily a local activity and regions are highly specialized when it comes to the types of technology that their company patents (Di Guardo and Galvagno 2005, 184).

Theories of knowledge creation are being developed for a single company in a network of different interrelated organizations. Theorists see the company as a network of relations between sub-units, groups and individuals, which in turn is embedded in a broader network of relationships with customers, suppliers, competitors and other organizations. The network acts as an ensemble learning and facilitating a creation and transfer of knowledge (Di Guardo, Galvagno 2005, 181). Networking of knowledge is defined as the people, resources, organizations and relations between them gathered in order to accumulate and use knowledge, primarily through a creation and transfer of knowledge with the aim of creating value (Powell 1990). Gulati (1999) emphasizes the concept of "network resources" that are made available to companies that are members of the network. Participation creates conductivity and flow of tacit knowledge that enables the identification of new options to extend the capabilities of the company.

Associating companies in the network has become an ordinary thing in the last 30 years. Studies have shown that there are several types of networking among companies. The most basic is the division into open and closed type of networking. Collaboration networks differ considerably in a degree of participation and openness for all those who want to join or become members. In the fully open cooperation or crowdsourcing to which suppliers, customers, designers, research institutions, innovators, students, and even competitors belong to, they all can equally participate (Pisano, Verganti 2008, 3). An open network usually seeks support from an unlimited number of those who are able to solve a problem.

Closed networks are opposed to these and they function as exclusive private clubs. Results of twenty years of survey indicate that it is very important to know how to lead a network. In

some networks, power of decision-making and problem solving is granted to a single company; in a network using this model that company is called a king-pin, and it is a hierarchical model. According to Pisano (2008) there is a flat network model, where members are equal partners in the process and equally share power on key issues. From the described categories it can be concluded that there are four types of networks such as: closed and hierarchical network (an elite circle), open and hierarchical network (Innovation Center), open and flat networks (Innovation Union) and flat networks (Pisano, Verganti 2008, 4).

The advantages of open networks are that they can attract a huge number of people who can solve the problem at the same time with a number of ideas. This is a case with the company Threadless, which produces blouses and which are designed by the outside people. With its structure "Innovation mall" has 600.000 members who have submitted 800 new designs per week. It is not necessary to know personally a man who brings a good idea, because members of the center vote for a particular design on the website and where appropriate. Thereafter the staff of the company decides what to produce and how to reward creators. The disadvantages of such a network are inability to always find the best players for solving a problem. Therefore the best teams have closed relation. Open models work best somewhere between the ideal solutions and the average solutions. The consequences are not significant in the absence of a better solution compared with elite players (Pisano and Verganti 2008, 5). Innovation communities area network where anyone can set a problem, offer solutions and decide which option to use. An example is Linux as an open source software community.

The elite circle selecting a group of participants by the company, which also defines the problem and chooses solutions. An example of this is Alessi - an Italian company designing households, which selected group of 200 experts and designers, who have developed a new concept of products for the home. The consortium is a private group of participants who elects problems together and decide how to work and choose the solution. An example is IBM's partnership with the selected companies which together develop electronic technology.

Network management can be horizontal and hierarchic. Hierarchic network management is desirable when the organization has the capability and knowledge required to define the problem and evaluate proposed solutions. The problems are mainly smaller parts sponsor a larger R&D program (Pisano, Verganti 2008, 7). These king-pins have a real understanding of appropriate technologies and markets (using needs and functional requirements) and can define the system and coordinate the work of various contributors. Level management models

are preferred when all associates have acquired interests in order to solve certain problems and they will only participate when they can say something in decision-making (Pisano, Verganti 2008, 7).

The example described by Pisano is the IBM and its consortium members who have been using all the technologies in their factories working together and developing technology together. For this reason, IBM and its partners have chosen network management where all have a powerful voice how technology will evolve. Designing incentives, equally financial and non-financial, attracting external collaborators are crucial for all four models listed above. Non-financial rewards such as high visibility in the labor market, increased reputation in their group, psychological fulfillment in achieving strong interest, and the chance to take advantage of solutions in your own business can be replaced or supplemented by a monetary prize (Pisano, Verganti 2008, 7). There are no certain rules how these forms function in cooperation. Pisano describes an example of Alessi, who not only share premium from the sales of its products created by designers from their elite circle, but also includes their names in marketing product already, and offers them a high degree of freedom in the design process. The mutual collaboration between the companies increases due to their confidence that create a favorable economic environment, where circulation of knowledge and ideas, exchange of information and transfer of knowledge can improve the performance of the company. In addition, it refers to an event at various levels between companies and individuals. Interpersonal trust is essential to this process. A high level of personal contacts in both cases as professional and social life promotes an increase in interpersonal trust, which is necessary to develop a high level of inter-organizational trust as the basis for a successful transfer of knowledge (DiGuardo, Galvagno 2005, 187).

A joint technological development means that the exchange of knowledge and openness are precondition for successful organizational learning. The openness and free exchange of information create a greater sensitivity of the companies towards a risk of »an expiration« of the information (Trott 2012, 253).

It is important to remember that the trust that is practiced and experienced among individuals is indeed active even when they represent an organization. Trust is a personal assessment and carries emotional and cognitive significance.

According to Giddens (1990) as long as the trust is at the system level, similar to confidence - in the case when there is no choice but to believe only to preserve the value of the currency -

the trust in the institution or organization depends on the personal experiences of individuals who represent the organization at its contact point. But that does not mean that the institutional dimension of trust needs to be underestimated (Trott 2012, 254).

## 3.5 Business Strategy

### 3.5.1 Types of strategies

The central question in competitive strategy is the position of the company within the industry. Position is determined by whether the company's profits above or below the average in the industry. The company that has positioned itself very high in their industry by having a high rate of return, although the industrial structure is unfavorable has modest average industry profitability (Porter in Quinn et al 1988, 65). The fundamental basis for above-average success is a long-term sustainable competitive advantage. The company may have a myriad of advantages and disadvantages in terms of competition, there are two basic types of competitive advantages a company can have: low cost or differentiation. The significance of any strength or weaknesses of that company depend on the ultimate function and impact of relative costs or differentiation.

One of the basic principles of creating enterprise business strategy is to analyze the external environment in which it operates. Observation of the external environment is part of the process of developing appropriate strategies and as such involves the systematic collection and analysis of information from the environment, which determines their impact on the present and especially the future operations of the company. Observing the environmental share includes the analysis of the wider external environment analysis and immediate external environment (Worthington and Britton, 1994).

Two basic types of competitive advantage combined with the scope of activities for which the company is seeking to achieve lead to three generic strategies for the achievement of the extraordinary success in the industry: the strategy of cost leadership, differentiation strategy and focus strategy. Strategy focus has two subtypes: a focus on low costs and focus on differentiation (Porter in Quinn et al 1988, 66). Each of these basic strategies involve fundamentally different routes to competitive advantage by combining the choice of the type of competitive advantage that you need to accomplish. Strategies cost leadership and differentiation seeking competitive advantage in a wide spectrum of industrial segments,

while the aim of the strategy focus precedence costs (cost focus) or differentiation (differentiation focus) in narrow segments.

Specific actions necessary to implement each generic strategy vary from industry to industry. As well as the practical implementation of the generic strategies in a particular industry. There are logical paths to the competitive advantages that have to be tested in any industry. The basic concept of generic strategies is that competitive advantage is at the heart of any strategy. Achieving competitive advantage requires the company to make a choice - if the company achieves competitive advantage, it must make a choice on the type of competitive advantages, which aims to achieve, and the scope within which this will be achieved.

The strategy of cost leadership is the clearest of all three strategies. The implementation of this strategy, the company aims to achieve a zoom in cost of participation based on the competitive advantage of lower costs compared to its competitors. This strategy of companies tends to be experience-based, advocating an efficient use of resources, economies of scale, and putting a strong cost control in place and by doing so reducing the cost price of their products and on this basis, achieve competitive advantage (Porter in Quinn et al 1988, 67). A cost leader implies a proper cost control - that has to be based on low production costs which ultimately imposes low sales prices (lower than their competitors) - while at the same time gaining the same level of profit. If competitors follow a cost leader and lower the price of the product to the extent that he has determined, such a company will continue to generate higher profits than its competitors because its production costs are low. It should be noted that a low cost of production should not be detrimental to the quality of products or services. Thus, the costing leader chooses the lowest level of product differentiation, because the differentiation of production is more expensive and it would thus strategically directly threaten a business unit on the basis up on which it builds its strategy. A cost leader ignores the diversity of market segments and positioning their products based on the average buyer. The reason for this is because of the adaptation of products to different market segment costs, as it increases production costs.

Using the strategy of differentiation firms tend to be unique in its industry along with some dimensions that are widely valued by customers. A firm strives to provide its products or services different from others in the industry. For a firm to achieve its goal of using this strategy it is necessary to carefully analyze the needs and behavior of customers, what they value most and how much they are willing to pay. When it finds a strategic business unit,

achieves competitive advantage through creating products or services that will fully satisfy the needs of customers in a way that is completely different from its competitors (Porter in Quinn et al 1988, 68).

The strategy of differentiation can be achieved in three ways: quality, innovation and responsibility towards customers. According to Mintzberg and Quinn a firm can be differentiated from others in its industry by: quality, price, image, support, and product design. A successful differentiation company offers the possibility of: determining the above-average price of their products, then increase sales volume and loyalty of customers to brand their products. The strategy of focusing is derived from the strategy of the previous two strategies, cost leadership and differentiation. The main feature of the strategy of focusing is that it is not implemented on the market as a whole, but on a focused market segment. This strategy directly meets the needs of a limited group of customers or market segment.

A strategy of focusing, based on cost leadership, is relevant if the company uses a strategy of focusing on low costing. It focuses on that market segment where it can achieve cost advantages in comparison to the cost leader selling its products to a wider market. The company may, on the basis of experience in the production of specific products have competitive advantages in relation to a larger firm that uses economies of scale as a way to lower costs (Porter in Quinn et al 1988, 68).

The strategy of focusing on differentiation based action, a company focuses on the development of differentiated products of one of the market segment or several market segments. The company focuses on a narrow production and thus achieves much faster innovation in the narrower field than a large company that achieves differentiation in the broader market. The strategy of focusing involves a relatively small investment compared to the other two strategies, but they require special creativity and innovation in finding specific market niches or groups of customers with their specific requirements. This strategy is used by small and medium-sized enterprises, while taking care to avoid competition with a large company that implements a strategy of differentiation in the broader market.

The position stuck in the middle (stuck in the middle) refers to companies that do not have a strategy of development and have any of the above strategies. Such firms in stable conditions can survive and operate at a profit, but as soon as changes occur in the market companies without a clear strategy and solid response to the situation, the first disappear, perish. But even the companies with formulated strategies may be found in the position of being stuck,

because they have chosen a wrong strategy, which is incorrectly formulated and implemented etc.

The companies that were operating at a profit can also be found in the situation ‘stuck’ due to, for example, the allocation of resources in a changing environment and can very quickly find themselves in a bad strategic position (Porter in Quinn et al 1988, 69). To avoid this phenomenon (stuck in the middle) a company should eschew both strategies simultaneously (a strategy of cost leadership and differentiation strategy). Successful strategic managers of the generic strategies should ensure that the company move in the direction of specific competitive strategies. Their role is such that they are observing the environment to maintain sources of competitive advantages in accordance with the opportunities and threats that arise in a changing environment (Porter in Quinn et al 1988, 69).

A strategy of innovation shall be closely connected with a vision of the company as well as its business strategy. Therefore, the companies need to communicate, in other words to share and transfer strategies and plans to all their employees. Goals and plans must be shared throughout the company in a smooth and unobstructed manner or else the continuous activity of employees will not be maintained at all levels and not to be commensurate with the functioning of the organization (Martensen and Dahlgaard 1999, 734).

A successful strategy of differentiation offers a buyer maximum value for its money, as it represents a guarantee for the long-term success of the company. There is an attitude that the only real source of the competitive advantage of a company is based upon the high quality adaptation of business conditions coupled with the efficient coordination of the internal resources. Some authors differentiate physical capital resources from human capital and organizational capital (Fabac 2002, 754). A proper application of the differentiation strategy ultimately demands that a company is obliged to choose qualities and features to differentiate itself from the competitors and rivals. A company must genuinely be unique in order to be perceived as an extraordinary entity, which then can expect a premium price for their goods and/or services (Porter in Qinn et al 1988, 68).

### 3.5.2 Dynamics of coopetition in innovation

For my work it is very important to explain what “coopetition” precisely means and how it develops its strategy. The very first person to use the term is Ray Noorda founder and first

CEO Novela. The term is set to shed light on the strategic links between competitors, however Brandenburger and Nalebuff in 1996 used the term coopetitors to accept five different types of players: the company, customers, competitors, suppliers and the supplements. The same authors have made a structure of multiple relationships in which the company is incorporated.

Coopetition can be described as a situation where cooperation and competition coexist in the same proportion. The fact remains that this kind of "coexistence" can take place in an inter-firm context, but also in many contexts within the organization such as: interpersonal, inter-group communication within a single unit or within a department, for example. In the existing literature intra-companies coopetition an enhancement of customer relationships and its financial performance and innovation, mainly as a result of the exchange of knowledge from learning from the consequences of units in the company (Luo et al 2006). According to Teece (1998) innovations are created through two separate and mutually connected processes: first added to the chaos, more knowledge and ideas, and the other reduces chaos combining existing ideas and knowledge into new innovations. These processes are associated with coopetition in the way in which the processes of knowledge creation are associated with cooperation and use of knowledge and all together they are connected with competition.

Innovation processes are shifting but they also coexist, as far as the acquisition of new knowledge is connected. Therefore, new knowledge will always be based on already existing knowledge or by internalization (Ritala, Välimäki, Blomqvist and Henttonen 2013, 66). Cooperative organizational culture and related capabilities are in particular a critical stage in the innovation process, when the best ideas from the competing teams to integrate innovation into a new team, are composed of the best ideas and people. Cooperation is the basis for the production of new innovative products. That is why the role of competition is there to challenge the status quo and prevent the occurrence of second-best solutions or ideas.

It is important to note that competition and cooperation play different roles in the process of knowledge creation. First, cooperation is used to improve the exchange of knowledge, then, competition is used to make several competing options, and finally through constructive confrontation, cooperation is used to compile a superior concept (Ritala, Välimäki, Blomqvist and Henttonen 2013, 67).

In my thesis I am dealing with the issues of dissemination of information within the organization. It is important to know that there are motives for the exchange of information in the organization and represent a combination of individual factors and the organization itself

(Wulff 2007, 75). A study was conducted by Tyler and Blader in 2001, about the behaviour of the group and what the challenges are as well as the values of the group that will contribute to the coherence of the images of the motives. The primary challenge in the work place is a cooperative work style that works well; it's actually an advantage where people who make decisions about a specific job may consult with colleagues in order to arrive at the correct decision. In such organizations an atmosphere of cooperation is very highly valued, while other advantages include not only cooperation, but also challenge, atmosphere, good colleagues, independence and learning (Wulff 2007, 77).

Through cooperation among colleagues and a strong sense of belonging to a group, over a very strong friendship ties with colleagues at work, points to the motivating factors exchanging information such as: community, helping each other, common interests, friendship, and active personality are important tasks. The importance of trust is the basis for the cooperative work and exchange of information in the organization (Davenport and Cronin 2001) while openness is the key to confidence (Wulff 2007, 92).

The essence of coopetition strategy provides the basis for a comprehensive integration of other theories and the theory of cooperation to generate the coopetition as a better understanding for sustainable business. Coopetitive system of creating real value to researchers and managers are sensitive to strategic phenomena such as searching for a company's competitive advantage and cooperation, where they simultaneously compete and cooperate.

A strategy of coopetition in principle does not reveal a sharp distinction between spontaneous behavior and an intentional search target. This is an approach in which the company takes care of environmental change and renewing within the coopetition, in order to improve their positions, resources and opportunities (Dagnino 2013, 39).

For the reasons of additional value creation the more companies and managers improve their understanding of coopetition, and open potential coopetition, the more they will deliberately choose a strategy coopetition. There are several levels of a coopetition strategy, and a macro level refers to interconnect clusters of firms and companies across the industry. A meso level refers to the relations among firms connected vertically or horizontally, that is, companies that communicate with each other as competitors or customers, and suppliers. A micro level refers to actors with such functions, and divisions within the company or the workers in the company. If all three levels of strategy are involved in the company we can count on the

coopetitive behaviour. Coopetition indications are used for clusters of firms and companies themselves in various industries, whereas they usually compete with the spending of government funds for research and development, access to capital markets and joint stock investment as well as the diversity of entering new markets. They can be found to cooperate in transferring best practice technology and new markets for exploration and/or exploitation. Companies within an industry can unite in this, while traditionally compete in the product market; hence they cooperate in product design, manufacturing and distribution, and define new standards (Dagnino 2013, 37).

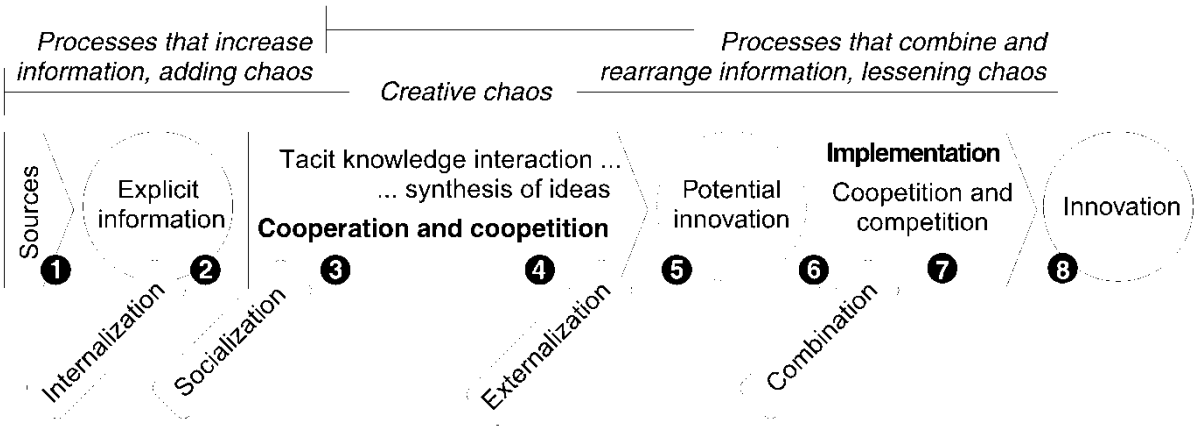
At the macro level, while the knowledge obtained about added value through intensive communication and information flow as well as the creation and transfer of knowledge within the industry, which turns into a reserve of knowledge; economic value is achieved through the reduction of aggressive and unrealistic rents and profits as well as division of funds. At the meso level, the value of knowledge is acquired through the creation of new knowledge and its transfer within the industry, through the deep communication and information flow via co-development and co-designing of products. The economic benefit is obtained through investments in research and development and investment and training of the workforce, together for joint R&D and manufacturing, rapid agreement on standards and reduced product time to market. At the micro level or at a level of the company, added value is assigned to the reserves of knowledge via the extended communication and information flow. Added value is created by new knowledge and its transfer within the company. The greater the incentives and commitments to the job, the greater the knowledge creation by the workforce.

The economic benefit is approved by the faster and more efficient transition from research and development to production and increased productivity of the total commitment of the workforce (Dagnino 2013, 37). As part of the innovation process and the objectives, the company sets a strategy for achieving them, which must be in line with the vision and mission of the company itself. Among the many business strategies for my work is an important innovation strategy that appears in several forms. Tidd, Bessant and Pavitt (2001, 6) believe that innovations bring benefits to firms by the form of their innovation. Because there are newspapers (news) as a form of innovation which involves delivering unique products or services as a strategic advantage to represent companies. Other types of innovations are radical products or technologies, which render a result of change in the rules of doing business in the industry, and this is of strategic advantage. The complexity of the investment itself does not allow for the emergence of imitation by competitors, however it is only for a

short period. An important competitive advantage is the time which an innovative company gains while it grows to become a more complex business entity.

At various stages, different people are involved in the development and sustenance of knowledge. Maintenance of knowledge is present in a variety of mixed cooperation and competition at different levels: an individual, at a level of projects and organization (Ritala, Välimäki, Blomqvist and Henttonen 2013, 68).

**Figure 3.4: Dynamics of coopetition in the innovation process**




*Source: Dagnino and Rocco (2013, 6).*

In the picture above different stages in the dynamics of the relationship between cooperation and competition in coopetition within the innovation process are represented.

First, knowledge and information flow coming from external and internal sources in the company. Some of these skills are created in earlier cycles of the process.

Second, any cooperation in the form of sharing knowledge ensures that existing explicit knowledge, information and data are available to everyone. This is similar to the process of internalization, which is one of the stages of SECI process. Individuals who have access to information can internalize this knowledge in their tacit knowledge. At this stage knowledge is collected throughout the organization, and competition between ideas had not yet appeared.

Third, cooperation concerning the interaction allows individuals to talk and deal with new ideas. You can create new combinations of knowledge, even through the idea of competing with each other. This represents a continuous interaction seemingly opposing forces in the synthesis process, and as such, is comparable to the socialization process in the SECI (Ritala et al 2013, 69). Individuals share their tacit knowledge, but still have access to explicit

knowledge that becomes a tested, raised in conjunction with the tacit and implicit knowledge of the participants. The more cooperation and exchange of knowledge there is, the more ideas there might be embedded in the competition between them. At this stage of knowledge sharing, the knowledge is primarily influenced by competition, therefore, we can name this as a beginning of co-existence of cooperation and competition (coopetition).

Fourth, through the emerging new knowledge using combinations of different teams that compete among themselves about how and by whom it is best to take advantage of new knowledge. In looking back this may inject potential innovation back into the process, and through such cooperation, can inevitably combine ideas with the aim of obtaining higher values. This phase is the externalization of the SECI process. The individuals demonstrate new ideas and knowledge, and thus may create new understanding and competence in their group. At this stage coopetition can be used to accelerate the innovation process by giving competitors an opportunity for cooperation in various ways.

Fifth, there are potential new innovations. This stage can be seen as a result of the preliminary, or as a package of suggestions, and is often considered as the starting point for the process of innovation. This can be seen as a point where coopetition fades, giving space for pure competition for the best solution for potential innovation.

Sixth phase - at this stage the company, actually its board of directors - elects which potential innovations are to be realized and in which projects to invest. Hence, potential innovations in fact compete for the limited resources of the company, the capital and the best personnel.

Seventh - at this stage, potential innovations are selected and company resources are allocated to them. There are two options where the company takes advantage of knowledge creation in the current process. First, the best potential innovations can be selected and thus the most respected knowledge in a competitive process can be used. Second, in order to utilize the option of coopetition, what is the best of the different potential innovation can be synthesized; creating intense cooperation among project's competitive. In this way, it can be argued that this phase include any competitive logic. In both cases, the choice should be based on the strategy of the company. It resembles a stage set in the SECI process, where he created explicit knowledge between several groups is used in the construction or combining of new products for company. Finally innovations are taken at the stage of commercialization and the market.

Therefore, the process of coopetition organizational innovation should be considered as cyclical and multiple. This model describes the ideal behavioural patterns, while in reality these patterns are not always fully realized, cooperative, competitive and coopetitive (Ritala et al 2013, 70). Every business relationship is defined based on two basic economic and social dimensions. The economic concept and dimensions defined through competition, while social concept defines cooperation (Castaldo, Dagnino 2013, 81).

A competitive relationship is based on both the economic and social content of competitors: the relationship between the two competitors whose economic aspects (presented by price, differences in cost and power markets) are associated with social contents (characterized by elements such as differences of social power, depending on the situation and dysfunctional conflict). It is a normal horizontal (firms in highly competitive industries without any relations of cooperation) and a vertical competition (buyer-seller, manufacturer-distributor without any dimension of cooperation). Collaborative relationships are characterized by a partnership based on economic and social aspects. It is a relationship between two partners without competitive aspects in which cooperation is based on the economic viability, trust and commitment (Castaldo, Dagnino 2013, 81).

Complete coopetition is a balanced mix of competitive and collaborative aspects, economic and social dimensions. This balanced mix is the true essence of coopetition and the main cause for its complexity. Trust is a central factor in any business relationship. Trust is an essential element for the exchange of knowledge within the alliances and relationships in order to develop new products (Castaldo, Dagnino 2013, 84). Trust is undoubtedly a psychological concept, but it is still based on social interaction, and the general social environment in which the relationship occurs. This social environment acts as an element of constraints for the development of trust, as well as the source of learning (Castaldo, Dagnino 2013, 87).

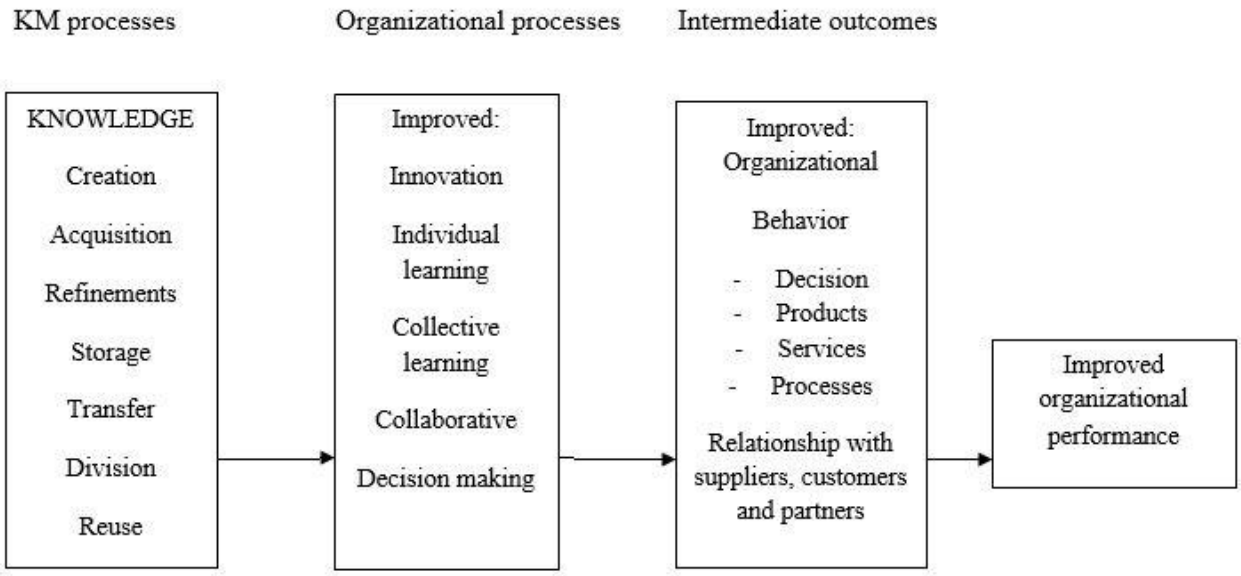
### 3.5.3 Improving innovation

Here is an example of several key roles that some individuals have in the innovation process: technical innovator - produces new ideas and see new and different ways to produce things, an expert in one or more fields, usually called “a crazy scientist”.

"A Technical-Commercial Scanner" is seeking huge amounts of information outside the organization often via a network. This includes market and technical information. "A Gatekeeper" keeps information associated with developments outside the organization, through journals, conference, colleagues and other companies. He transmits information to others, serves as a source of information to others in the organization (Trott 2011, 103). "A Product Champion" is selling new ideas to others in the organization, search sources, takes risks. "A Project Manager" provides leadership and motivation, planning and organizing the project, fulfills the administrative tasks, coordination between team members, monitoring whether the project is progressing and effectively balances the goals of the project with the needs of the organization. "A Sponsor" helps a team to get all that is needed for carrying out the project in other parts of the organization, provides legitimacy and organizational trust in the project (Trott 2011, 103). Figure below (3.5) shows that KM (knowledge management) directly improves organizational processes such as innovation, shared decision making, and individually and collectively learning.

It improves organizational processes resulting better outcomes such as better decisions, organizational behavior, products, services and relationships. In return, workers improve performance in the organization (King 2009, 6).

**Figure 3.5: Knowledge management improving organizational processes**

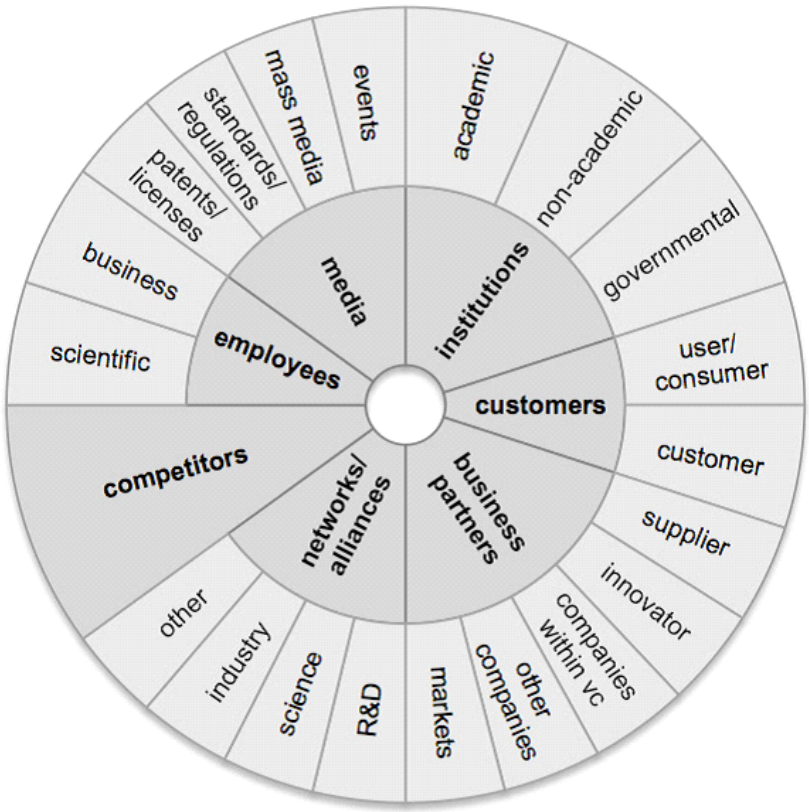



*Source: King W. (2009, 6).*

In knowledge management a first level where companies use external knowledge and innovation development is research. Once knowledge is utilized, the next process is transfer of knowledge from an external constituent to the company. In this phase knowledge cross the boundaries of company, and imported in knowledge becomes a part of the internal knowledge of the company. In the end, the company needs to integrate the transferred external knowledge with the existing internal knowledge in order to get the value, and thus create innovation.

In the search for external knowledge it is pretty logical to first investigate with the company that is close to ours and or active in the same industry and thus make less radical moves. Theorists believe they should organize a routine "social action program" which means to manage organizational behavior. This routine social meeting is relatively stable under the influence of experience and history of the company and the individuals in them. Both companies recognize external knowledge as well as their pre-existing knowledge base (Almeida, Phenom and Grant 2006, 359).

**Figure 3.6: External knowledge of the company**




*Source: Kruse Paul (2012, 6).*

Figure 3.6 shows seven categories and 20 sub-categories, ranging from academic institutions such as universities, laboratories, research institutions, and non-academic (commercial/private research institutions) and government institutions (chamber of commerce, government) originating from the Freeman's theory of stakeholders, and results include forms of cooperation, such as scientific networks, R&D alliances, industry associations and other contracts and agreements.

The important players are also: customers, such as users/consumers (we prefer the users or user groups) or customers (potential customers, such as target groups, etc.), competitors, business partners such as suppliers (materials, IT-information technology, software, etc.), innovators (intermediaries etc.) and the company (specialized SMEs, service providers, etc.) or outside of the value chain (consulting, start-up, etc.), employed as scientists (researchers, PhDs, alumni, etc.), business or related personnel (external experts, mediators for knowledge-knowledge brokers, etc.) and media such as documents in the form of patents and licenses, standards/regulations (regarding safety, health standards, etc.) mass media (sources from the Internet, magazines, TV, browser, etc.) and events (fairs, tradeshows, conferences, workshops, etc.).

The interactions of the players result in various forms of cooperation such as scientific networks (science parks, university associations, etc.) alliances of research and development (research projects, consortiums, etc.), industrial federations (cooperation agreements, technology parks, industrial clusters, etc.) and other consensual agreements (community, joint ventures, strategic alliances general, etc.).

Although the range includes many sources, not every bearer of knowledge can contribute to competition and innovation. However, current research points out that some sources are more often taken into consideration (i.e., academic institutions, customers and suppliers) in relation to the others (referring to the standards, inventors, patents, etc.) (Kruse 2012, 6).

Cooperation is the basic institution in the process of knowledge sharing, networks are presented as the coordinating institution exchange of knowledge, providing a cognitive framework for transforming information into useful knowledge (Steiner 2006). Nets lead to coordination that not only enhances the capabilities of each company, but will benefit that firms are not isolated from one another, and offer the benefits of specialization and diversity generation (Kogut 2000). The question arises "why do firms participate in the nets?" The answer is that networks help companies to develop and absorb new technology, learn skills,

maintain access to the necessary assets to make it easier to withstand the shock of the environment, improve the chances for survival and financial performance. Not all firms are attractive enough to be accepted into the networks, only certain firms are eligible to be members of the network (Cooke 2011, 223).

Stuart (1998) argues that the motive for the alliance is twofold: the first is based on the specific characteristics of the company that affect the company that has entered the Merz (size, age, intensity of research and development); the other consists of positions and technological networks, and the ability to set the alliance. It refers to the fact that entry into the network heavily depends on the position in the market and the social structure of the model must be applied to the analysis of economic markets (Cooke 2011, 223).

If networks are oriented towards an exchange of knowledge, then how does this exchange take effect? The exchange occurs through interaction, and the structure of the interaction has a strong impact on the amount of knowledge diffusion. In the background still looms the question that the amount of knowledge that is overflowing and the positive side of scientific discoveries that are available to all potential users, and as such are a major factor in endogenous growth especially in a geographically limited area. This automatic and free-good nature of knowledge is pervasive even in enclosed and confined spaces with distinctive exchange markets may logically be questioned (Zucker, Darby and Armstrong, 1998): there are degrees of "natural excludability" depending on how well known the techniques of replication are, how strongly information is embodied in certain individuals, and how strongly the access to a research team is controlled. Gulinani (2005) emphasizes these two explanatory approaches, first, attributed to the knowledge of a public nature, this means that learning and knowledge sharing within networks is externally-driven. Here is a collective learning process associated with a given territory, and local interaction is not only unstructured and unplanned, but is also very widespread and diffuses (Campagne, 2002 in Cooke 2011, 224).

An alternative approach emphasizes the emergence of the specific characteristics of the firemen and learning at the firm level in order to understand the interaction of learning at the network level. The diffusion (dispersion) of knowledge is quite selective and highly structured at a relative distance from the base of knowledge in the company and dependent on the position of firms in networks and their *absorptive* capacity (Giuliani and Bell 2005). The second position implies a very strategic behaviour within the companies: the company is trying to establish different types of interactions and relationships, while each of them has a

different impact on the generation of knowledge and the process.

Owen-Smith and Powell (2004) claim that especially in scientific fields, organizations which develop links to different types of organizations and implement multiple types of activities are likely to become central players in such networks (Asheim and Cooke 2011, 224).

Knowledge changes economic activity and vice versa economic activity changes knowledge - and by doing so, they are subject to change themselves. Consequently this kind of interaction within the network, as well as the interaction between the network members force the network to adapt to the changing conditions of competition, technology and social structure (Asheim and Cooke 2011, 224).

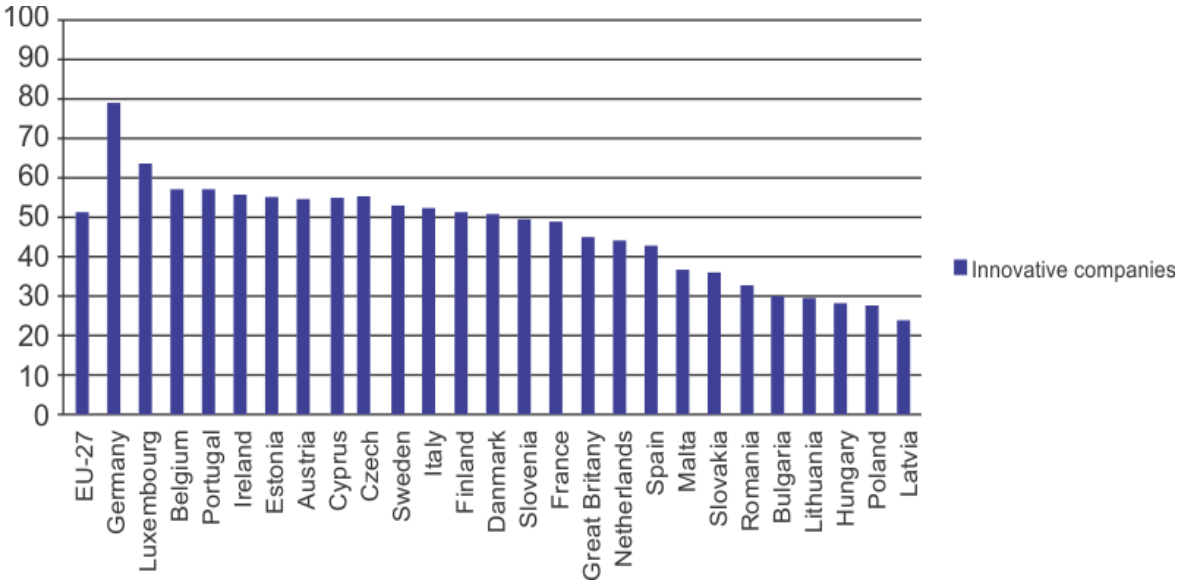
# 4 THE EMPIRICAL PART

In the previous section we have shown the theoretical basis of our study, in this part of the thesis we will focus on the data obtained for Slovenia and Germany.

Generally speaking, corporate competitive advantage is built through the implementation of corporate strategy. Both process and product innovation, are crucial in this context, as an element of increasing market potential and internal efficiency. Slovenian companies were included in the constant changes since 1990. Attitudes toward the company's innovative activities are examined and the success of innovation is connected with the inner and outer environment and strategic stakeholder attitudes towards innovation (Prašnikar et al 2012, 363).

From the attached chart it can be seen that innovative activity in Slovenia is below the average of the European Union. Slovenia is together with Bulgaria, Estonia, Malta, Portugal and Romania between the countries with the highest annual growth in innovation performance, which significantly exceed 5%, so it is in their group together with Estonia leading in growth. Bearing in mind the overall innovation performance - Slovenia is below average in her group (Rošer 2011, 268).

**Graph 4.1: Participation of the innovative companies in the EU (2008)**




*Source: Eurostat (2012). European Commission Report for summer 2010*

A situation in the area of innovation is somewhat improves, but it takes a lot of work in the field of motivation of innovative activity. According to Rošer (2011, 268) the state (Republic of Slovenia) should encourage research and educational institutions and companies to get together with young companies should launch applied research and development of ideas. According to the same author, it is necessary to sort out a legislative system in the area of intellectual property and pay greater attention to transfer of knowledge, mobility of researchers and support to applications for patents registration. They are also significant tax incentives for companies that invest in the development and greater interaction between the economic and research sectors (Rošer, 2011, 268).

Human capital and the participation of companies in innovation continued to be strong indicators for Slovenia. In Slovenia there is an open, excellent and attractive research system, while investments in companies are weak points of the Slovenian economy (Innovation Union Scoreboard 2013, 50).

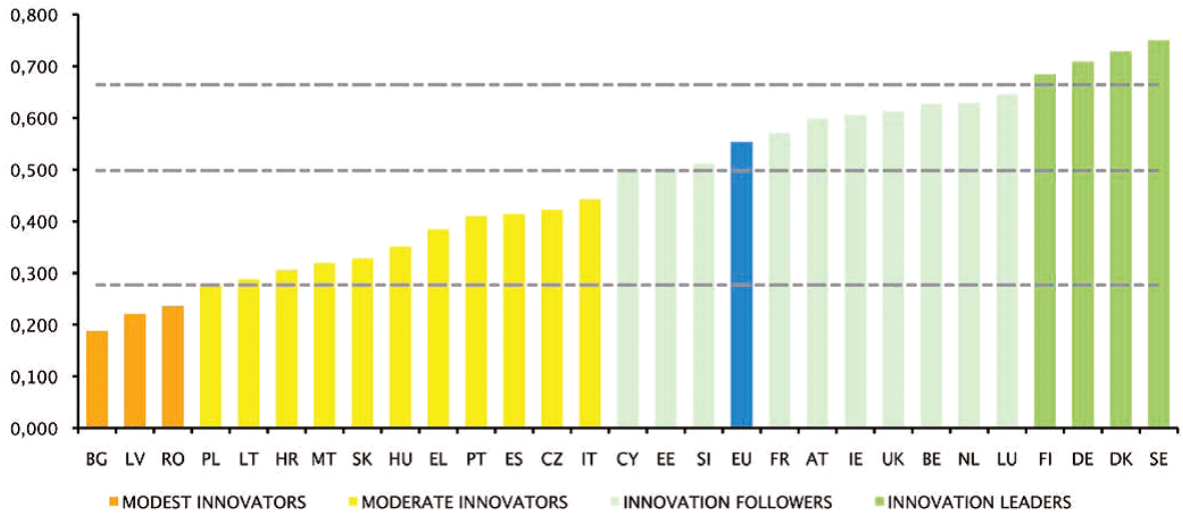
According to the European Commission for 2013, Germany is one of the leaders in innovation with the above-average success rate (performance), which lies in the strength of innovators and intellectual property. A relatively high growth was seen in small and medium-sized enterprises collaborating with others in brands and licenses, as well as income from patents from abroad. A strong decline is observed in non R&D innovation and weaknesses are in open and attractive research systems and regarding expenses and sales of new products on the

market and new innovative firms. The growth which was observed is also well above the average (Innovation Union Scoreboard 2013, 32).

The group of countries leading innovations includes Sweden, Denmark, Germany, and Finland. These are countries that have more success than the average in the EU. The group of innovators followers includes Austria, Belgium, Cyprus, Estonia, France, Ireland, Luxembourg, the Netherlands, Belgium, Slovenia and the United Kingdom. These countries are innovative successor in innovation over or around the EU average. The group of moderate innovators includes Croatia, Czech Republic, Greece, Slovakia, Hungary, Italy, Malta, Lithuania, Poland, Portugal, and Spain. According to innovation criteria they are below the European average.

Modest innovators Romania, Latvia and Bulgaria, are well below the EU average. European Commission is measuring innovation according to the assembled indicators, including data on 25 indicators with the lowest possible value of 0 and the highest possible value of 1. The report results are based on data for the period 2011-2012, because the newer are not yet available (Innovation Union Scoreboard 2014, 4).

**Graph 4.2: Innovation of the member state for the year 2014**




*Source: European Commission Report, Eurostat 2014*

In the past year, the expenditure for researches and development of Slovenian companies had a high growth. Income from overseas mainly came from licenses and patents. Slovenia had lower expenses last year from areas not related with innovations. Slovenia has an above-average potential for growth in openness, excellence and attractiveness of research systems,

as well as in intellectual property and investment companies (Slovenian Business and Research Association, Brussels 2013).

The research carried out by GLOBE (Global Leadership and Organizational Behavior effectiveness project) demonstrated that the key values of German leaders are: avoidance of uncertainty, they are self-confident, determined and their relationships are open and serious (Du Brin 2007, 429-431).

I am describing this as the title of my thesis is a comparative study on the impact of external knowledge on open innovation in Slovenia and Germany as the largest economic partner of Slovenia. Social factors that strengthen the German economy (Weihrich 1999, 5) are:

- The domestic market that demands quality
- Highly-educated, skilled and motivated workforce
- The population is very proud of its workforce
- Public education and professional education system

One of the strengths of Germany is consumers' demand for high quality products and such demand provides impetus for the establishment of the leading industries in Germany today. Domestic market that demands quality of their domestic producers creates an atmosphere of high expectations of exports in the rest of the world.

A highly skilled and motivated workforce provide the human capital necessary for the production factoring quality products required by domestic and world markets. The costs associated with the provision of quality are greatly reduced because the manufacturing workforce grew up in an atmosphere that fosters and expects pride in the work (Weihrich 1999, 5).

The strength of the German economy lies in the educational system of the state. Education is a dual, which means that in vocational schools educate future workers while gymnasiums are intended to produce future engineers and doctors. Germany has a focus on vocational training and technical education. It provides a basis for a high-quality and skilled workforce. Furthermore, internships secured for pupils in factories where they work as interns combined with theoretical knowledge gained in school represent a perfectly organized system of professional vocational education. Young people who opt for the three-year vocational school work (apprenticing), spend three to four days in a company and remaining one to two days in school learning theory. The program leads to qualifications in specialized areas (mechanic,

electrician). Although these are ordinary workers who belong to the working class in the German society, they enjoy a high status (Weihrich 1999, 5).

Slovenia and Germany have traditionally been business partners. Around 250 German companies operating in Slovenia, or represent a part of an enterprise invested to by Germany. Germany is the biggest trading partner to Slovenia (25% of export). Germany is also fifth largest investor in Slovenia (German Embassy in 2014, 2 September). Germany is a country that invests in research and development more than any other European country. By 2008, a number of researchers, technicians and engineers increased by 30,000 compared with 2005, and total number of them in 2008 was 330,000) (Federal Report on Research and Innovation, 2010). Within the period from 2000-07, Germany has recorded the greatest number of international patents per capita (per million inhabitants). A growth of number of patents application increased by 20% (this is compared to the EU-27 and Japan and USA) (Federal Report on Research and Innovation, 2010). Since Slovenia is an innovation follower I want to compare what is the difference between Slovenia and Germany. In the further text I shall elaborate about research question and hypotheses.

### 4.1 A Research Question and Hypotheses

My selected topic is elaborated theoretically in the first part of the thesis. I shall now test it with the empirical research. More about the research shall be presented in the next chapters. Consequently, I would like to formulate a research question and hypotheses.

**The research question** is formulated as follows:

**What is the ability of an individual to take up an initiative during the establishment of professional contacts with experts outside the organization?**

It is known that in organization there are informal social networks composed of innovators, scientists, researchers, managers, technicians and other participants in the process of innovation, which build on its own intra or inter-organizational networks (Cooke 2011, 157). In order to establish as good professional contacts as possible, with the experts from outside, it is necessary to maintain co-operative work style which functions well. This is actually an advantage where decision-makers may consult with the colleagues to make the best decisions.

In such organizations atmosphere of cooperation is highly valued, while other advantages

include cooperation, challenge, atmosphere, good colleagues, independence and learning (Wulff 2007, 77). This is achieved through cooperation among colleagues and a strong sense of belonging to a group. Establishing strong friendship ties with colleagues at work suggests motivating factors exchanging information such as: community, helping each other, common interests, friendship, and active personality is important tasks. Trust is the base of the cooperative work and exchange of information in the organization (Davenport 2000, Wulff 2007, 91) and openness is the key to confidence (Wulff 2007, 92).

In knowledge management when we make an integration of external knowledge there is a process of transformation of *explicit knowledge to tacit knowledge* or internalization. This is a process of embodied explicit knowledge into tacit knowledge. Externalization and combination are internalized in the silent knowledge of the individual in the form of exchange of mental models or technical knowledge. This process helps that knowledge is verbalized or documented in the instructions or verbal stories. Socialization is associated as "learning by doing" experience (Nonaka i Takeuchi 1995, 69).

In open innovation models, bilateral exchange of knowledge is encouraged. That is manifested through internal use of external knowledge (inbound open innovation) and external use of internal knowledge (outbound open innovation) as reflected in research, retention and utilization of knowledge that can be maintained within or outside the limits of enterprises (Lichtenthaler and Lichtenhäler 2009).

*To achieve* a better effect in solving the current problems in the organization, there are groups called communities of practice. These are informal collaborative networks that support professional practitioners and their efforts to develop and share a common understanding and engage in work - it is relevant for the construction of knowledge (Correia et al 2010, 12). These practices add value to the community organizations in several important ways: they assist in the management strategy, starting new jobs, solving problems quickly, transferring the best practices, developing professional skills, and helping companies to hire and retain talent (Wenger and Snyder 2000, 140). Thus, technology should allow members to socialize, be friendly-helpful and offer assessment of a "health" of the community (i.e. the number of registered members, the number of active members, the number of created knowledge artifacts and their date of manufacture) (Preece and Maloney-Krichmar 2003).

However, some of the limiting factors in the virtual community of practice is associated with the technology, because there is no non-verbal communication such as, for example, visual

signals, rituals that are very important for the exchange of silent knowledge (Krogh and Grand 2001).

In some organizations, involvement of workers in the process of knowledge development is conditioned by cultural factors. One of the key success factors of open innovation is a fluctuation of employees as an indicator of an open and inclusive culture, the ability to retain and exploit tacit knowledge, and lack of leakage of intellectual property (Warren and Suzman 2010, 19).

There are several levels of coopetition strategy, and a macro level refers to interconnected clusters of firms and companies across the industry. A meso level refers to the relations among firms connected vertically or horizontally, that is, companies that communicate with each other as competitors or customers, and suppliers. A micro level refers to actors such as functions, and divisions or the workers in the company. If all three levels of strategy are involved in the company we can count on the coopetitive behavior. They can be found to cooperate in transferring best practice technology and new markets for the exploration and exploitation (Dagnino 2013, 37).

The organizational culture that motivates and rewards the creation and sharing of knowledge creates favorable conditions for the development and creation of knowledge (Correia 2010, 13).

The basic hypothesis would be:

**H1 hypothesis: If an individual is adopting more of new knowledge, he/she would more often take up initiative to establish professional contacts outside the organization.**

As an example of adoption of new knowledge in the organization we may mention various courses, seminars, additional training, exchange of knowledge and experiences among various sections of the company. We start from the hypothesis that when an individual is adopting more of new knowledge he/she would be more motivated to re-establish a professional contact outside the organization in order to gain new knowledge. In organizations there are communities that are by nature fluid and self-organized, and they are formed on a personal basis and they establish relationships among employees (Gamble 2001, 80). Such communities of practice are defined by Gamble as a collection of individuals limited with informal relationships that share similar job roles and a common context. These are the groups that:

- voluntarily come together for a common goal;
- have members who identify themselves as part of the community;
- constantly involved in activities with other members and communities;
- have interactions lasting an indefinite period of time.

The question is where the knowledge of these groups (community of practice) is coming from? In communities of practice, an individual is involved in the community with existing knowledge. These are professional practitioners who form an informal network in which to develop and share a common understanding and work-related activities which equal a construction of knowledge (Hara, 2009, 118).

Svetlik (2005) separated the eight sets of key competencies that are important for establishing contacts within and outside the organization. In my research most of the variables are related to the presence of the below competencies, as I aim to prove that a link exists between the performing a learning process and establishing contacts outside the organization and knowledge transfer. The first two groups are essential for selected variables in my research, while other groups refer to more specific competencies that should be owned by an individual, depending on his/ her occupation.

1. Social competence in terms of the ability of good relations with others, working in teams, communities;
2. Proficiency in the mother tongue, written and oral skills, reading as a rapid acquisition and proper understanding of written information;
3. Mastering new technologies (especially information and communication technology) and media;
4. Intercultural competence in terms of knowledge of different cultures as well as mastery of at least one foreign language;
5. Entrepreneurial competence in terms of an ability of organizing, planning, management and decision-making.

Competencies that individuals possess are based on the interconnection and relationship of cognitive and practical skills, knowledge, motivation, value orientation, attitudes, feelings and other types of behavior, which as a whole could be used as an efficient operation. (Svetlik in Pezdirc 2005, 22). Key competencies are crucial for the success of any organization; if you use them more, they are strengthened and they create a greater value. Through the competences representing the characteristics of the organization, the organization itself is

recognizable on the market (Trott 2012, 202).

Communities of practice add value to organizations in several important ways: they assist in guiding strategy, start new lines of business, and solve problems quickly. They also transfer best practices, develop professional skills, helping companies to hire and retain talent (Wenger and Snyder 2000, 140).

Knowledge is created and expanded through social interaction between the tacit and explicit knowledge. Nonaka and Takeuchi (1995, 61) referred to an interaction "knowledge conversation". It should be emphasized that this conversation is "social" process between individuals, not restricted within the individual. Tacit knowledge is partly composed of technical skills that are hard-defined, and can be classified under the term "know-how" and at the same time has an important cognitive dimension. It consists of mental models, beliefs and perspectives so that we take for granted, and we cannot articulate.

*The knowledge transfer partnership model* is active in a field of technology transfers from universities to small companies. It is executed by post-graduate students, who spend two days a week at universities, and three days a week in companies - however they are being committed to relevant projects all the time. This program functions successfully for 30 years already (Trott 2012, 353).

In the cognitive approach knowledge flows through the channels of information, studying and watching as enshrined in the territorial structure through: huge mobility of professionals and experts - between companies, but also internally to the local labor market defined by a part of the city, where mobility is maximal, and intensive cooperative ties between local stakeholders, in particular the relation between customer-supplier and production, design, research and knowledge creation in the end (Cooper 2011, 113).

There are different criteria for a classification method of using external knowledge sources, such as transfer of information from informal networks. This is one way to get to know, and does not require formal agreements or contracts and do not develop organizational interaction between companies and external sources of knowledge (Hakansson and Johansson 1992). According to the same authors, an informal network for transfer of information has the characteristics of social networks. The informal network that has the characteristics of a social network does not require large transaction or management costs as well as maintenance costs. Through these advantages, companies can gain more knowledge on the external easier way to

react more quickly to rapid changes in the environment or crisis and innovate more easily.

Therefore we state that the more an individual is adopting new knowledge; he/she would more often take the initiative to establish professional contacts outside the organization.

**H2: If an individual is more involved in innovations, he/she would take up more initiative in establishing the professional contacts outside the organization.**

Many authors define innovation as an idea or behavior that is new to the organization and it lies in the knowledge that an employee possesses. (Almeida, Phenom and Grant 2006, 357). In open innovation models, bilateral exchange of knowledge is encouraged. That is manifested through internal use of external knowledge (inbound open innovation) and external use of internal knowledge (outbound open innovation) as reflected in research, retention and utilization of knowledge that can be maintained within or outside the limits enterprises (Lichtenthaler and Lichtenhäler 2009). Companies implementing a combined process do mix the outside-in process (getting external knowledge) with the inside-out process (placing ideas directly on the market) and by doing so jointly develop and commercialize innovations (Enkel, Gassmann and Chesbrough 2009, 303).

In the closed innovation model, there is resistance to the ideas and knowledge that comes from outside the company. This syndrome is called a "not invented here" syndrome, however, when talking about the model of open innovation, the relationship is just the opposite. It is a positive one and it is proudly exclaimed that something is found elsewhere (Chesbrough 2003, 49). The open innovation models require new systems and processes, which are responsible for processing a whole range of responses within the specific time periods. We can define open innovation as the intended use of incoming and outcoming knowledge with the aim of improving internal innovation and expanding markets for external use of innovation (Chesbrough, Vanhaverbeke and West, 2006, 1).

Procter & Gamble created an innovative model called "*connect and develop*". With a very clear understanding what consumers need, we can identify promising ideas worldwide, and require our own R&D creation marketing and supply, in order to have faster, cheaper and better products. This model functions at present in such a way that more than 35 % of new products possess elements coming from the outside of P&G (Huston and Sakkab, 2006).

Here are a few examples of some of the key role that individuals play in the innovation process. A technical innovator - produces new ideas and sees new and different ways to

produce things, an expert in one or more fields, usually called a “mad scientist”. A technical - commercial scanner - requires huge amounts of information outside the organization often over the network. This includes market and technical information. A gatekeeper keeps information associated with developments outside the organization, through journals, conference, colleagues and other companies. He/she transmits information to others, serves as a source of information to others in the organization (Trott 2011, 103). Informal social networks are made up of innovators, scientists, researchers, managers, technicians and other participants in the process of innovation that are building intra or inter network (Cooke 2011, 157). An innovation is widely recognized as a social process, including the interaction of alliances and collaboration with different stakeholders, and they rarely show as a result of individual attempts of a company (Freeman 1991, and Cooke 2011, 156).

There is a correlation between the innovation process and external environment of the company and internal environment of the company, to examine a flow of knowledge within the innovation process. It illustrates how an open innovation paradigm, built on previous research, was presented as an option for the management of innovation. This confirms that access to and use of the flow of knowledge is a fundamental part of the innovation process (Trott 2011, 348).

Competition and cooperation play different roles in the process of knowledge creation. First, cooperation is used to improve an exchange of knowledge, then competition is used to make several competing options, and finally through constructive confrontation, cooperation is used to compile a superior concept (Rita, Valimaki, 2013, 67). At a micro-level (a company-level) value added reserves of knowledge have been allocated over the extended communication, information flow as well as the creation of new knowledge and its transfer within the company. It creates a greater incentive and commitment to the job and the creation of knowledge by the employees (Dagnino, 2013, 37). At the meso-level, the value of knowledge is acquired through the creation of new knowledge and its transfer within the industry, through the deep communication and information flow through co-development and co-design of products (Dagnino, 2013, 37). Therefore, we state that the more an individual is involved in innovation; he/she would have more confidence to take up the initiative to establish professional contacts outside the organization. A derived hypothesis would be:

**H3: If an organization works locally it would be taking up more initiatives for an establishment of professional contacts outside the organization.**

A geographical, cultural and institutional proximity provides companies with a special access, closer ties, better information, powerful incentives, and other challenges that are difficult to touch from a distance. A competitive advantage lies more in local matters such as knowledge, connections and motivations that rivals operating at a distance cannot replicate (Trott 2012, 243).

The search for knowledge is not only based on technology but also on geographic search (Almeida, Phene and Grant 2006, 359). Studies on innovation and spreading knowledge and technology have established that there is a geographical localization of knowledge. . Analyzing various data from many companies it follows that they cooperate with universities seeking knowledge from each other in certain geographic locations. A key reason is that knowledge remains in a certain geographical area, where the connections and exchange of knowledge between companies in the region are being executed. Those connections can be in a form of formal and informal alliances, such as social networks or regional mobility of engineers (Almeida, Phene and Grant 2006, 362).

Storper (2000) has used a term "territorialization" to describe a local network including institutions, culture, industrial structure and internal organization of the dominant company (Di Guardo, Galvagno 2005, 183). There is a strong correlation between the businesses that are concentrated on one space so the dynamics and a local spread of knowledge and innovation will be dictated by the limited geographical area.

A transfer of knowledge depends on the relationship between the institutions in which knowledge is produced (universities, R&D sector, research centers) and receiver or local firms. This clearly leads to a conclusion that the production of knowledge is primarily a local activity and regions are highly specialized when it comes to the types of technology that their company is patenting (Di Guardo, Galvagno 2005, 184).

A regional structure of production and exploitation of knowledge subsystem is usually consisting of companies, particularly where these show a tendency of grouping in clusters (Cooke 2011, 394). There are several elements in the institutional context which influence a creation and exchange of knowledge and innovation at the end. These influences are sometimes direct and sometimes they are through their impact on networks: knowledge institutes, management and policy, financial infrastructure and industrial context (competition, interaction between companies in the value chain, the presence of key companies) (Cooke 2011, 395).

An example of a local operation is a formation of industrial clusters, which are formed in order to gain a competitive advantage from external economies and to increase a yield of companies (Asheim et al. 2006, Isaksen 2011, 293). The formation of clusters depends on preconditions such as a location factor, or a driver (causing) event, which changes a location for the new production use, and initiates a development of clusters. The preconditions are, inter alia, availability of raw materials, specific knowledge and R&D organizations or knowledge based on experience, or specific or sophisticated needs of specific groups of customers or geographically concentrated firms (European Commission 2002, 14).

Key institutions of technological clusters are universities and research institutions, because relevant knowledge is created there. Castells and Hall (1994) identified three functions of university in a development of technological clusters. First and the most important is to create new knowledge, both basic and applied. Secondly, universities train a workforce of scientists, engineers and technicians, which are the key ingredient for the development of new technologies. Thirdly, universities may have a direct entrepreneurial role, by supporting further researches within the local companies' networks. An example of the establishment of entrepreneurship in the sophisticated knowledgeable environment is an establishment of industrial parks or incubators in liaison with universities (Audrech et al 2006). Together with a government and industry universities create support developments of companies, which in turn creates self-sustainable dynamic whereby industrial actors become increasingly prominent in creation of new companies (Malecki 2011, 319).

The first group of a sectorial approach explains the capacity of local innovation and emphasizes the presence of a "science-based" or high-tech sector; regions where there are these sectors are defined as the scientific regions that lead a transformation of the economy and economic growth (Capello 2011, 108). "Science" regions are the base for large and very well-known scientific institutions, where deep connections between these institutions and industrial plants are being established, but these links have not been often visible. That was indeed very disappointing (Capello 2011, 109).

A coopetitive system of creating a real value makes it possible that researchers and managers are sensitive to strategic phenomena such as searching for a company's competitive advantage and cooperation, where both compete and cooperate (Dagnino 2913, 38).

Therefore, we state that the more organizations are active at a local level, which implies mutual interaction in any sphere of communication even during the exchange of knowledge,

the more individuals would be taking up initiatives to establish professional contacts outside the organization.

**H4: If an organization would compete with a quality rather than a price, it would be more successful in taking up an initiative for establishing professional contacts outside the organization.**

There are differences in the approaching and implementing innovation and placing a product on the market. For example, European countries have a long history in the development of scientific inventions, but they suffer from a poor understanding of the market and often do not utilize the full potential that comes from their inventions. American companies have the ability to earn profits from the market, but they do not improve continuously in price and quality. While the Japanese and Asian companies have extensive capabilities in a field of quality and production efficiency (Trott 2012, 238). Economists traditionally see companies as isolated and small rational players. According to this view, a way in which companies cooperate is only through the markets, which is price driven. For a long time economists have not thought about a fact that in parallel with the transactions in the market, companies can be embedded in the social and personal relations or connections, bound to affect their economic behavior (Cooke et al 2011, 156). A company may have a myriad of advantages and disadvantages towards competition.

There are two types of competitive advantages a company can have: low cost or differentiation. A significance of the strength or weakness of companies is a function and influence on the relative cost or differentiation (Porter Quinn in 1988, 65). A market in which consumer demand exists for the high quality products is Germany. This demand provides incentives for the establishment of the leading industries in Germany at present. A domestic market that demands quality of their domestic producers creates an atmosphere of high expectations of exports to the rest of the world. A highly skilled and motivated workforce provide the human capital necessary for the production of quality products demanded by domestic and global markets (Weihrich 1999, 5).

A production and sale of counterfeit products is a big business in the international economy. The value of sales of counterfeit products annually passes over one trillion dollars! The massive expansion of the Chinese economy leads to a dramatic increase in foreign direct investment and international technology transfer and the problem of intellectual property (Trott 2012, 184).

According to Mintzberg and Quinn a company may strike out from the others in the industry in terms of quality, price, image, support, and product design. A successful differentiation of the company offers a possibility of determining above-average prices of their products, then increase sales volume and ensuring customer loyalty to their brands. A cost leader is able based on low production costs to impose low sales prices (lower than their competitors). At the same time they make a same profit - which represents a strategy of cost leadership. If a competition is followed by a cost leader and lower cost products up to the level set by the cost leader, this company shall take over and continue achieving higher profits than its competitors because of the low production costs (Porter in Queen et al 1988, 67).

If the company is using a strategy of focusing on the basis of low cost, it focuses on a market segment where it can achieve cost advantages in comparison to the cost leader that sells its products to a wider market. The company may, on the basis of experience in the production of specific products have competitive advantages in relation to a larger firm that uses economies of scale as a way to lower costs (Porter in Quinn et al 1988, 68).

Therefore, we state that the quality is the only "healthy" condition for a long-term survival of the product on the market, which is accompanied by a higher priced product.

**H5. If an organization is facing a stronger competition, an individual would be taking up more initiatives to establish professional contacts outside the organization.**

The future lies in an appropriately balanced approach to open innovations, where the company or institutions use every available tool to create successful products and services faster than the competitors, and at the same time encourages the construction of key competences and protection of their intellectual property (Enkell, Gassmann, Chesbrough, 2009, 312). Therefore, competitive advantage - explores whether this derives from a product quality, time to market, technological innovation, content, services and customer satisfaction, or intellectual property rights and other (Warren and Suzman 2010, 20).

It is important to note that competition and cooperation play different roles in the process of knowledge creation. First, cooperation is used to improve the exchange of knowledge, then, competition is used to make several competing options, and finally through constructive confrontation, cooperation is used to compile a superior concept (Ritala, Valimaki 2013, 67).

Porter (1985) points out that a competition among the companies is affected by numerous factors. We shall mention only a few: the number of companies or competitors in the industry;

the degree of growth of the industry; height of fixed costs with which they do business enterprises; costs of supplies and durability of goods; changes in product costs; size of shareholdings; exit barriers; diversity of competition and saturation of the industry.

One of the basic principles of creating an enterprise business strategy is to analyze the external environment in which it operates. An observation of the external environment is a part of the process of developing appropriate strategies and as such involves the systematic collection and analysis of information from the environment, which determines their impact on the present and especially the future operations of the company. By observing the environment we share analyses of the wider external environment as well as the immediate external environment (Worthington and Britton, 1994).

An open innovation can be seen as an attempt of the company to benefit from external knowledge without having to make a large internal investment in long-term studies; however, the company cannot fully rely on external sources of knowledge if they want to be different from competitors (Cooke 2011, 402).

If a competition is more intensive, you need to analyze your competitors, more knowledge of the environment is necessary to obtain by the organization. If competitors are more developed in the environment, individuals are forced to seek knowledge from the environment or are forced to seek knowledge in professional relationships outside the organization.

### 4.2 Samples and patterns

The hypotheses above are checked with a help of secondary data obtained within the HEGESCO study of Higher Education as generator of strategic competences for Slovenia. The study thereof involved Lithuania, the Netherlands, Hungary, Poland and Slovenia as EU members and Turkey which is a candidate for EU membership. The survey was conducted in 2007 and of 2008. My second source was the REFLEX research (Research into Employment and professional Flexibility) from where I used the information about Germany.

Questions were related primarily to a transition from study to employment. A central research question was about "competence required for successful entry into the labor market". In the survey six thousands Slovenian graduates participated, and they completed the study five years before interview. A half of the graduates filled the questionnaire, while additional

information were obtained with the help of interviews with employers and higher education institutions. Hegesco database has about 40.810 responses of the graduates. In my master's thesis I explore and analyze the answers of the graduates who have completed their studies in Slovenia. The base is composed of 2.923 individuals (32.5 % are men and 67.4 % of graduates are women). At the moment the surveyed was answered (in 2008) the mean age of participants was 34 years. Their studies were completed in 2003, which means that the questions were answered five years after their graduation.

International research REFLEX (Research into Employment and Professional Flexibility) was performed in fifteen countries: Austria, Belgium, Czech Republic, Estonia, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Portugal, Spain, Switzerland and the United Kingdom (REFLEX 2007). The REFLEX survey sample includes 70,000 graduates who have graduated in the study year 1999/2000. The study observed that modern society demands competencies and knowledge of its graduates and a level of competence that the graduates achieved throughout their education.

### 4.3 Description of variables

The hypotheses relating to the five independent variables and one dependent variable from the questionnaire HEGESCO and REFLEX.

#### 4.3.1 Dependent Variable

*Sharing knowledge*

A dependent variable has an interval character and it is measured by the following question:

"**The G17-c**" To what extent do the following statements apply to your professional role?

**G17-c:** *"I take the initiative in establishing professional contacts with experts outside the organization".*

The answers are offered on the five-level scale, where 1 represents very low level, and 5 very high level to take the initiative.

### 4.3.2 Independent Variables

1. *Innovation and knowledge*

Innovation and degree of involvement in innovation is measured by asking:

**G11:** *"Do you play a role in introducing these innovations in your organization?"*

**c)** *Knowledge or methods* (nominal variable)

I recoded this variable so that the question can be answered either yes or no. And I indicated with the name: involvement in innovation.

2. *Competencies*

**H1:** "*How do you assess your actual level of individual competences?"* is a question that relates to another independent variable" **d)** Ability to quickly adopt new knowledge

Offered is a seven-stage scale response where 1 is scored very low and 7 very high level. This variable is called: quickly adopt new knowledge.

3. *Area*

**G8:** *"What is the scope of operations of your organization?"* is represents a third independent variable.

In my thesis I offered two responses, because I re-coded the variable and I got following responses: locally and internationally. While in the original questionnaire the four answers were offered: locally, regionally, nationally and internationally. I've marked as variable area.

4. *Price or quality*

**G6:** *"Does your organization compete mainly by the price or by quality?"* a 5 degree scale is offered for responses and another answer to the question is not appropriate. I named her: price or quality.

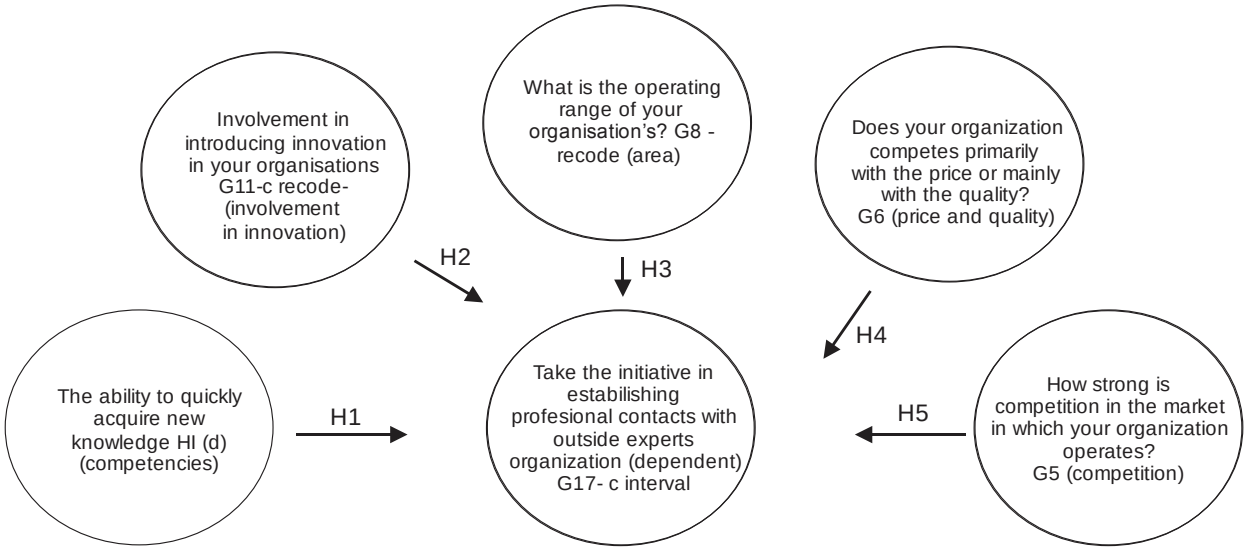
5. *Competition*

**G5**: *"Ho strong is a competition in the market in which your organization operates?"* a five-

stage scale is offered for the answer and one answer to the question is not appropriate. It's named: competition.

Variables schematically look like the sketch regression which I presented below, and apply the same to the data Hegesco for Slovenia, as well as REFLEX data for Germany.

**Figure 4.1: Regression with variables**




## 4.4 Description of basic research methods

My research took place at the level of innovation in organization studies in the field of knowledge management and transfer of the same, within the organization and externally as well, as search for answers to the research question.

Looking at the type of variables that I chose and forms of information that I received from the database Hegesco for Slovenia, I used various statistical methods in the context of multivariate analysis.

Descriptive statistics are seen by a group of statistical methods dealing with summarizing data obtained from studies conducted at the specific sample (pattern) of the population. Descriptive statistics are based on graphical description, presentation using a chart, then tabular description that clearly represents the data with the help of tables. The task of descriptive statistics is to show at least two statistical characteristics of the population or its parts, the statistical unit. One activity is showing how the units are connected among themselves, and what common features are generated. A task of descriptive statistics is the first step in the analysis of data that have been collected and edited (Wikipedia, 2012).

I have edited the data obtained in the form of frequency analysis and contingency tables, the procedures I used are: descriptive statistics, bivariate analysis and regression. Bivariate analysis is a statistical approach, where one variable is compared with another. In bivariate analysis often encounter regression analysis, trend, correlation coefficients, and so on.

Standard deviation (deviation, σ sigma) is a statistical indicator and is often used to measure the dispersion of statistical units. It is possible to measure how widespread the values held by the population are. The standard deviation shows the distribution of the measured values around the mean. The higher the standard deviation, the more scattered are responses.

The correlation coefficient can range between -1 and +1. If the value is greater than or equal to +0.30, we talk about proportional correlation. If the value of the correlation coefficient is less than or equal to - 0.30, we talk about inversely proportional correlation. For all other values that are between 0 and - 0.29, and between 0 and + 0.29, one cannot talk about correlation. The best-known correlation coefficient is Person's coefficient. In addition to the correlation coefficient, which indicates the connection / disconnection of numerical variables in the sample, it is necessary to take into account the statistical significance of the coefficient. If the aforementioned statistical significance is less than 0.05, we argue that a correlation exists in the selected population.

Analysis of variance or ANOVA is a statistical approach with which the collective variance between the piles of data are separated into individual components, in order to check whether the differences between patterns explicable as statistical deviations within the same population.

Regression analysis examines the relationship between two random variables, between the dependent variable and one or more independent (explanatory, explanatory) variables. This relationship was examined in such a manner that the regression model is used which is oriented so that the value of one or more variables used to predict the values of the dependent variable.

When the dependent variable is dependent on more than one explanatory variable, we are talking about multiple regression. With this form of regression we use a multidimensional model as a linear function. I processed data with the statistical package SPSS for data processing version 17.0.

# 5 RESULTS

## 5.1 Hegesco study Slovenia[2]

### Multiple linear regression

For empirical research of variables that I chose in master thesis, I used a linear regression using the keyboard (Table 5.1: Regression model of independent variables and the dependent variable). It is necessary to estimate the impact of independent variables (there are 5) on the dependent variable. With a linear regression function the variance of the dependent variable explained by the independent variables can be estimated.

**Table 5.1: Regression model of independent variables and the dependent variable**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | competition, involvement in innovations, fast acquiring of knowledge, price/quality and area | . | Enter |

a All requested variables entered.
b Dependent Variable: taking up an initiative

I first checked whether the linear regression model that is meaningful to all independent variables affect the value of the dependent variable. I used ANOVA test (see table below

Table 5.2: Result of ANOVA statistical test (b)). From the table it can be concluded that the F-statistic for checking the entire regression model 32.914, which means that there is a statistical significance (at significance, 000), and we can reject the null hypothesis that all regression coefficients are equal to zero and thus confirm the significance of the regression model.

2 See the tables with frequency distribution and bivariate analysis in Annex A.

**Table 5.2: Result of ANOVA statistical test (b)**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 219,793 | 5 | 43,959 | 32,914 | ,000(a) |
| | Residual | 2014,027 | 1508 | 1,336 | | |
| | Total | 2233,820 | 1513 | | | |

a Predictors: (Constant), competition, involvement in innovations, fast acquiring of knowledge, price/quality and area
b Dependent Variable: taking up an initiative

Coefficient of determination $R^2$ (Table 5.3: The determination coefficient for Slovenia below) shows us, to what extent independent variables impact the dependent variable "take the initiative in establishing contacts outside the organization". Since $R^2$ depends on the number of independent variables, the interpretation of the results we use the corrected coefficient of determination $R^2$. The table shows that the corrected regression coefficient is high ($R^2$ = 0.095) which means that the independent variables explain 9.5 % of the variability of the dependent variable.

**Table 5.3: The determination coefficient for Slovenia**

| **Model Summary** | | | | |
|---|---|---|---|---|
| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
| 1 | ,308[a] | ,095 | ,092 | 1,15731 |

a. Predictors: (Constant), competition, involvement in innovations, fast acquiring of knowledge, price/quality and area

From the table (see below Table 5.4: Regression analysis for Slovenia), we can understand how the independent variables competition, price/quality, area, involvement in innovation, quickly acquiring of new knowledge affect the dependent variable taking the initiative. We take that statistically significant correlation is up to permitted significance 5%. In table 5.4 we see that "quickly acquiring new knowledge" and "involvement in innovation" with significance = 0 statistically significantly affect the dependent variable. Value of T – test for the variable "quickly acquiring new knowledge" is 7.922 and for "involvement in innovation" is -7.775, which means that when "quickly acquiring new knowledge" increases, than "taking the initiative" increases also. For "involvement in innovation" the situation is opposite; when variable "involvement in innovation" decreases than variable "taking the initiative" increases. The variable G11 "involvement in innovation" is re-coded (namely, there are only two offered answers: YES and NO) and when we have a negative result in the regression, we actually count that the result thereof is positive.

In case of variables "price and quality" significance is less than 0,005 which means that

"price/quality" have statistically significant influence on taking the initiative.

Variable "area" has sig = 0.015 which means that there is also statistically significant correlation. Potential to make a mistake is 1.5%.

T- test for bout variables "price/quality and area" are positive meaning that with the increase of independent variables dependent one "taking the initiative" increases also.

Last variable is "competition" in this case we cannot say that it has statistically significant influence on the dependent variable "taking the initiative". Because the significance 17,5% is considerably too high to be able to claim that "competition" statistically significant influence on a dependent variable "taking the initiative". That means it is 17.5% possibility to make a mistake (because we cannot claim that they are connected).

**Table 5.4: Regression analysis for Slovenia**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | T | Sig. |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 1,966 | ,261 | | 7,533 | ,000 |
| | Quickly acquiring knowledge | ,234 | ,030 | ,195 | 7,922 | ,000 |
| | Involvement in innovation | -,573 | ,074 | -,193 | -7,775 | ,000 |
| | area | ,148 | ,061 | ,061 | 2,426 | ,015 |
| | price/quality | ,084 | ,029 | ,070 | 2,838 | ,005 |
| | competition | ,037 | ,027 | ,034 | 1,358 | ,175 |

a Dependent Variable: taking up initiative

The dependent variable is "taking the initiative"

- * r <0.1
- ** r <0.05
- *** r <0.01

Standardized Beta coefficient reveals the direction and power connection of individual variables.

β closer to 1 = strongly positive influences

β closer to 0 = no influence

β closer - 1 = strongly negative influences

The value of the coefficient (see above Table 5.4: Regression analysis for Slovenia) means that if the Independent variables change for one standard deviation, the dependent variable will also

change for the β standard deviation.

If we look at standardized beta coefficient we see that the value β = 0.195 is highest in case of variable "quickly acquire new knowledge", which means that this variable has the highest influence on "taking the initiative".

The variable "involvement in innovation" follows with the value β = - 0.193, which also powerfully and negatively influences (with reduction of one, other variable is increasing) the variable "taking the initiative".

Beta coefficients for other variables are between β=0.034 for competition, for area β= 0.061 and for price and quality β= 0.070, which means that mentioned variables approximately equally influence dependent variable "take the initiative", but considerably less than the above mentioned two variables (quickly acquire new knowledge and involvement in innovation).

With the achieved result thereof, I could confirm my first hypothesis for Slovenia. Namely, if an individual is adopting more of new knowledge, he/she would more often take an initiative to establish professional contacts outside the organization.

Furthermore, on the basis of the results, I can also confirm the second hypothesis for Slovenia, specifying that the more an individual is engaged in innovation, he/she would take up more initiative to establish professional contacts outside the organization.

The results are positive for Slovenia, and I hereby confirm the third hypothesis, specifying that when an organization works locally, it would be taking up more initiatives for an establishment of professional contacts outside the organization.

The fourth hypothesis is also confirmed for Slovenia, because price and quality have statistically significant influence upon taking the initiative for an establishment of professional contacts outside the organization.

### 5.2 Reflex study Germany[3]

#### Linear regression

With a linear regression function we can estimated the impact of independent variables on the dependent variable.

**Table 5.5: Linear regression model for Germany**

| Model | Variables Entered | Variables Removed | Method |
|---|---|---|---|
| 1 | competition, involvement in innovations, fast acquiring of knowledge, price/quality and area | . | Enter |

a All requested variables entered.
b Dependent Variable: taking up an initiative

**Table 5.6: Result of statistical test ANOVA (b) for Germany**

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 153,174 | 5 | 30,635 | 22,486 | ,000(a) |
| | Residual | 1245,251 | 914 | 1,362 | | |
| | Total | 1398,425 | 919 | | | |

a Predictors: (Constant), competition, involvement in innovations, fast acquiring of knowledge, price/quality and area
b Dependent Variable: taking up an initiative

From the table above it can be concluded that the F-statistic for checking the entire regression model is 22.486, which means that the model is statistically significant (at significance, 000), and we can reject the null hypothesis that all regression coefficients are equal to zero.

3 See the tables with frequency distribution and bivariate analysis, see Annex B.

Coefficient of determination $R^2$ (table below Table 5.7**: Coefficient of determination for Germany**) shows us, the dependence of variable "take the initiative in establishing contacts outside the organization" on the independent variables. Since $R^2$ is dependent on the number of independent variables, we use the corrected coefficient of determination $R^2$, for the interpretation of the results. The table shows that the corrected regression coefficient is quite high ($R^2 = 0.110$) which means that the independent variables explain 11 % of the variability of the dependent variable.

**Table 5.7**: **Coefficient of determination for Germany**

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|---|---|---|---|---|
| 1 | ,331(a) | ,110 | ,105 | 1,16723 |

a Predictors: (Constant), competition, involvement in innovations, fast acquiring of knowledge, price/quality and area

From the table see below (Table 5.8 Regression analysis for Germany) we can understand how the independent variables competition, price/quality, area, involvement in innovation, quickly acquiring of new knowledge influence the dependent variable "taking the initiative".

In table 5.8 we see that the relation between "quickly acquiring new knowledge" and dependent one "taking the initiative" (value of T test = 5.251) is statistically significant, which means that when "quickly acquiring new knowledge" increases, than "taking the initiative" increases also. For "involvement in innovation" situation is opposite, value of T – test is -8.436 (sig = 0,000). Therefore, variable "taking the initiative" increases when variable "involvement in innovation" decreases. This means that the greater "involvement in innovation" results in several initiatives for the establishment of contacts with professional experts outside the organization. Negative connotation in this case confirms the "involvement in innovation" in the forefront when it comes to the "taking initiative" for the establishment of contacts with professional experts outside the organization. Based on the results, we can confirm that the independent variable "quickly acquiring knowledge" (sig. = 0,000) and "involvement in innovation" (sig. = 0,000) significantly influence the dependent variable "taking the initiative".

Other variables like "price and quality" (sig. = 0,475), "area" (sig. = 0,626) and "competition" (sig.= ,475) do not affect the dependent variable because significance in all tree variables is absolutely too high.

With this result I could confirm my first and second hypothesis for Germany. It means that

more an individual is engaged in innovation the more he/she will takes the initiative to establish professional contacts outside the organization. And for second hypothesis for Germany that the more an individual is engaged in innovation the more he/she takes the initiative to establish professional contacts outside the organization.

**Table 5.8: Regression analysis for Germany**

| Model | | Unstandardized Coefficients | | Standardized Coefficients | | |
|---|---|---|---|---|---|---|
| | | B | Std. Error | Beta | T | Sig. |
| 1 | (Constant) | 2,735 | ,347 | | 7,893 | ,000 |
| | Quickly acquiring knowledge | ,215 | ,041 | ,166 | 5,251 | ,000 |
| | Involvement in innovation | -,678 | ,080 | -,267 | -8,436 | ,000 |
| | area | -,040 | ,081 | -,016 | -,487 | ,626 |
| | price/quality | ,023 | ,032 | ,023 | ,714 | ,475 |
| | Competition | ,029 | ,040 | ,024 | ,715 | ,475 |

a All requested variables entered
b Dependent variables: taking the initiative

The value of the Beta coefficient (see table above) means that if the Independent variables change for one standard deviation, the dependent variable will also change for the β standard deviation.

If we look at standardized beta coefficient we see that the value β = 0.166 is highest and positive in case of variable "quickly acquire new knowledge", which means that variable has highest influence on "taking the initiative".

Variable "involvement in innovation" β = -0.267 also powerfully and negatively influence the dependent variable (with reduction of one, other variable is increasing).

Variables "area", "price and quality" and "competition" does not affect the dependent variable take the initiative. Extremely low coefficient of the independent variable "price and quality" (β = 0.023), "competition" β coefficient (β = 0.024) effect on the dependent variable, and at the end of the variable with the least influence of the "area" with the beta coefficient (β = -0.016) indicates that there is almost no impact on the dependent variable "take the initiative".

# 6 RESULTS AND REFLECTIONS ON THE HYPOTHESIS

Chapters in the theoretical part of the thesis talk about innovation, knowledge, external knowledge, communities of practice, competition, strategies. The goal was to elaborate networks and clusters of knowledge transmission through communities of practice. A subject of academic inquiry was to determine consequences of the development of innovation in the country. We focused on factors influencing a success of open innovation, knowledge transfer, promotion of competences and geographical organization. All this is connected with the empirical work of the master's thesis in which I use the five independent variables versus a dependent being used in the research Hegesco project for Slovenia and research results Reflex for Germany.

The independent variables are: the ability of quick adoption of new knowledge (H1-d) engagement in innovation (G11-c), area (G8, locally and internationally), price or quality (G6) and competition in the market (G5) versus dependent variable take the initiative in establishing professional contacts with ordinary skill outside the organization (G17-c). I wanted to check whether the independent variables affect the dependent using linear regression (shown in the previous section) and found that in both cases (Slovenia and Germany) independent variables quickly adoption of knowledge and involvement in innovation have a very strong influence on the dependent variable. These are variables that are related to the individual in the organization (individual variables) and the main hypothesis of this paper reads:

**Hypothesis 1:** *If an individual is adopting more of new knowledge, he/she would more often take an initiative to establish professional contacts outside the organization.*

The results of the frequency distribution of the independent variable "quickly acquiring new knowledge" (H1-d) in Slovenia amounted to 37.6 %, for Germany is 43.0 %. In both countries these independent variables affect the dependent variable G17-c "take the initiative". In Slovenia the other independent variables such as involvement in innovation, area and price or quality has positive affect. These variables significantly influence the dependent variable taking the initiative. Only variables competition G5 does not affect the dependent variable G17-c (take initiative).

Variable quickly adopting new knowledge affects the dependent variable (take the initiative)

in the case of Slovenia (Pearson chi-square value is 171.253 for Slovenia). The results were also positive for Germany (Beta = 5.251 B in sig. < 5 % =, 000). There is a strong influence of the independent variables quickly adoption of new knowledge on the dependent variable taking the initiative. Given that the results show a powerful connection between quick adoption of new knowledge and take the initiative in establishing contacts outside the organization this hypothesis can be confirmed. **We confirmed our assumption that if individuals adopt new knowledge they will take the initiative to establish professional contacts outside the organization. As individual learns he/she will be more motivated to establish professional contacts outside the organization.**

Grossett (2008) argues that the geography of innovation does not rely on knowledge, but on social networks, regardless that knowledge is included (Cooke 2011, 278). Learning is the main result of social capital. Real strength of the cluster lies in the tacit knowledge that exists among employees in companies that are part of the cluster, and their spread to other companies and institutions (Cooke 2011, 290).

Networking of knowledge is defined as the people, resources, organizations and relations between them are gathered in order to accumulate and use knowledge, primarily through the creation and transfer of knowledge with the aim of creating value (Powell 1990). Nonaka (1991, 10) points out that knowledge lies in the individual.

With my comparative empirical research I proved that both in Slovenia and Germany if an individual involved in innovation is being developed on a personal level, he/she competencies improves existing competencies. This gives the individual more self-confidence and courage to take up the initiative to establish professional contacts outside the organization. Knowledge and transfer of knowledge can be the motive for professional development of individuals.

**Hypothesis 2:** *If an individual is more involved in innovations, he/she would take up more initiative in establishing the professional contacts outside the organization.*

The results of the frequency distribution for example engaging in innovation (G11-c) for Slovenia are 78.8 % and for Germany amounts to 64.7 %.

Independent variable involvement in innovation also has a powerful influence on the

dependent variable taking the initiative both in Slovenia and in Germany. Beta in the case of Slovenia is (β = -193; sig. < 5 % =, 000) which means that it affects the dependent variable. The minus sign does not represent a negative impact on the contrary a positive impact on the dependent variable, the correlation between the variables in the foreground. Beta in the case of Germany is (β = -267, sig < 5 % = 000) showed a statistically significant effect on the dependent variable.

Correlation and linear regression showed that the level of involvement in innovation affect the initiative in establishing professional contacts outside the organization (R squared is 0.095) for Slovenia, and much higher for Germany (R squared is 0.11). The relationship between variables is linear and statistically significant, which means that we can extend the conclusion from sample to the population. According to the results, we can *confirm* this hypothesis for both countries (Slovenia and Germany).

There is a correlation between the innovation process and the external environment of the company and internal environment of the company, to examine the flow of knowledge within the innovation process. It illustrates how an open innovation paradigm builds on previous research and presented as an option for the management of innovation.

This confirms that access to and use of the flow of knowledge plays a fundamental part in the innovation process (Trott 2011, 348). Innovation or in modern words wise use of advanced knowledge, is considered to be one of the key promoters of economic development in the knowledge-driven society (Capello, 2011, 107).

Innovation is widely recognized as a social process, including the interaction of alliances and collaboration with different stakeholders, and they rarely show as a result of individual attempts of a company (Freeman 1991). There are two options how a company can exploit a potential of innovation and the company's resources. It can be done through a social interaction that takes place in the social environment that acts as an element of constraint for the development of trust as well as the source of learning (Castaldo, Dagnino 2013, 87).

Following the results of statistical analysis I can confirm the association between the use of new knowledge and involvement in innovation with taking the initiative to establish professional contacts outside the organization - therefore **both hypotheses (first and second) have already confirmed and are valid for both Slovenia and Germany.**

The second group of variables in both studies was related to the level of the organization. We

have studied the influence of the independent variables: area (G8) then the price or quality (G6) and competition (G5) on the dependent variable taking the initiative to establish professional contacts outside the organization (G 17-c). The derived hypotheses are:

**Hypothesis 3***: If an organization works locally it would be taking up more initiatives for an establishment of professional contacts outside the organization.*

The results of the frequency distribution for the independent variable region (G8) amount to 63.4 % in Slovenia and 65.9 % for Germany in favor of the local operation of the organization. The correlation between the independent variable "area" and the dependent "taking the initiative" exist (Pearson chi-square value is 21.727) in Slovenia. The regression coefficient for the variable "area" is significant (0.015).

For Germany (Pearson chi-square value is 2.972) there is no statistical correlation between the variables. In Germany (significance = 0.626) the independent variable does not affect the dependent variable taking the initiative.

A division into sectors explains the capacity of local innovations that emphasize the presence of "science-based" or high-tech sector; regions where there are these sectors are defined as the scientific regions that lead the transformation of the economy and economic growth (Capello 2011, 108).

One of the examples is a local operation and the formation of industrial clusters, which are formed in order to gain a competitive advantage from external economies due to increased yields for the company (Asheim et al. 2006, Isaksen 2011, 293). The formation of clusters depends on preconditions such as location factor, or the driver (causing) event, which addresses the location of the new production use, and to initiate the development of clusters. Preconditions are, inter alia, availability of raw materials, specific knowledge and R&D organizations or knowledge based on experience, or specific or sophisticated needs of specific groups of customers or geographically concentrated firms (European Commission 2002, 14). The results show that independent variable area for Germany does not affect the dependent variable taking the initiative so that this hypothesis is rejected. It turned out that in Slovenia Company develop local networks that are strong and have long-term goals for survival, because the local communication is better than the international level. Therefore, **hypothesis H3 is confirmed only for Slovenia, but not for Germany.**

**Hypothesis 4:** *If an organization would compete with a quality rather than a price, it would be more successful in taking up an initiative for establishing professional contacts outside the organization.*

Results of frequency distribution for the independent variable cost or capacity development (G6) was 33.5 % in Slovenia and 33.5 % for Germany in favor of the quality of the products offered by the organization, not the price (for Slovenia was 3.1 % for Germany and 7,7 %) competition with a price. For Slovenia I confirmed this hypothesis because the value of Pearson Chi-square 39.782 for Slovenia and the regression coefficient is significant = 0. 005.

On the other side for Germany there is no statistical correlation because the value of Pearson Chi-square 19.202 (almost half less than Slovenia), between variables there is no statistical significant correlation (0.475) **For Germany I reject this hypothesis, while in Slovenia there is a statistical correlation and this hypothesis is confirmed.**

Local market that demands quality of their domestic producers creates an atmosphere of high expectations of exports to the rest of the world. Highly skilled and motivated workforce provide the human capital necessary for the production of quality products required by local and world markets (Weihrich 1999, 5). Competitive advantage is at the heart of any strategy and achieving competitive advantage requires the company to make a choice on the type of competitive advantages, which aims to achieve, and the scope within which this will be achieved, this is the basic concept of generic strategies (Porter in Quinn 1988, 67).

**Hypothesis 5:** *If an organization has a stronger competition, an individual would be taking up more initiatives to establish professional contacts outside the organization.*

The result of the frequency distribution for the independent variable "competition" (G5) is 34.8 % in Slovenia and 39.2 % for Germany. There is no correlation between the independent variables and the dependent "competition" and "taking initiative" (Pearson chi-square value is 27.284 for Slovenia), for Germany (Pearson chi-square value is 16.927) between the variables there is no statistical association. The regression coefficient for the variable competition (significance = 0.175 for Slovenia) and for Germany (significance = 0. 475).

Considering that there is no impact of competition on the dependent variable taking the

initiative **the hypothesis (No. 5) can be rejected for Slovenia and as well for Germany.** In the case of both countries, competition does not play any role in establishing professional relationships outside the organization. It is positive to have strong competition, which is the starting point for achieving other goals, so the individual is motivated to have better results in their work.

The companies that are open to cooperation with scientific institutions that are flexible and networking at the local level take more risk but are easier to overcome competition in the market. Competition and cooperation play different roles in the process of knowledge creation. First, cooperation is used to improve the exchange of knowledge, then competition is used to make several competing options, and finally through constructive confrontation, cooperation is used to compile a superior concept (Rita, Valimaki 2013, 67).

As cooperation and exchange exist, the more ideas would perhaps generate more competition between them, and it is a beginning of co-existence between cooperation and competition, which is called "coopetition" **(**Ritala et al 2013, 69).

The results of analysis for Germany show that variables at the organizational level (environment, quality-price and competition) have no statistically significant effect on the dependent variable (take initiative), although we expected some impact on the dependent variable. For Slovenia only variable competition does not affect the dependent variable.

The variables that were related to work activity (learning and involvement in innovation) of individuals in the organization influence the independent variable, so that our assumptions about the positive correlation are confirmed (applies both to Slovenia and Germany). This means that competencies of individuals are very important for a quick acquiring new knowledge and to engage in innovation, in the establishment of professional contacts outside the organization. Organizations cannot successfully innovate using only internal knowledge and are unable to survive in the fast changing environment. Companies need to explore and exploit external knowledge for innovation and to cooperate with other organizations in order to survive (Kang 2009, 15).

# 7 CONCLUSION

Today organizations are faced with changes in all areas, and with advances in technology, demanding consumers, with increasing competitive pressure, the financial crisis and many others. Some organizations can monitor global changes, have the potential and financial strength to invest in research and innovation, whilst others believe that it is an unnecessary expense in the crisis conditions to invest in research. Universities are an important source of external knowledge for innovation in firms. This statement is in accordance with the view of "open innovation", which claims that companies have recently become increasingly dependent on external sources of technological innovation (Chesbrough 2003).

My aim is to demonstrate the effective use of external knowledge and its impact on the creation of innovations in the organization. With this purpose, I wanted to prove that external knowledge which has been placed in the community of practice has an important role in the creation of open innovation.

Technological innovation is a dynamic process based on a complex and multi-disciplinary knowledge that can be effectively nurtured through academic links. The traditional view of the relationship university-industry cooperation is reflected in the alliances that create opportunities to gain high technology together with the development of innovation in universities (Baglieri 2013, 128). Academic researchers follow their three combinations of F (fame, fortune and freedom), while the company follows its goal - profit. In the cognitive approach to knowledge, it flows and information channels are investigated and seen as integrated in the territorial structure of an area through: the huge mobility of professionals and experts among companies. It also includes internal mobility towards the local labor market defined by the district or the city with the maximum mobility. It also understands the intensive cooperative ties among local stakeholders, in particular customer-supplier relationships in production, design, research and eventually knowledge creation (Cooke 2011, 113).

Those organizations that have communities of practice (Community action practice) add value in several important ways: they assist in the management strategy, start new lines of business, and solve problems quickly, transfer best practices, develop professional skills, help companies to hire and retain talent (Wenger and Snyder 2000, 140).

My research demonstrates that when considering dependent variables taking the initiative, by

the five independent variables in Slovenia and Germany, companies in Germany are taking the initiative differently than companies in Slovenia! The results demonstrated that the observed dependent variable in Slovenia more significantly influences our selected independent variables than in Germany. We have established that the variable taking the initiative in Slovenia is significantly affected by four selected independent variables such as: Quickly acquiring knowledge, Involvement in innovation, Area and Price/Quality. For Germany it was shown that in a framework of selected independent variables that the variable "taking the initiative" significantly affects only two selected independent variables, and they are "Quickly acquiring knowledge" and "Involvement in innovation". If we interpret results to the contemporary Slovenian situation, we may conclude that they are meaningful, because Slovenia is a small country therefore variable "area" has more influence on "taking the initiative" than in Germany, with the significantly bigger territory. It would be the same for a variable Price/Quality because Slovenia has GDP per capita that is slightly bigger than half of the Germany's GDP. The reason is that German companies launching their products on the world market and also have a long tradition of quality products which guarantees high profit.

On individual level (my first and second hypothesis) I confirm hypothesis for both countries, Germany has a better result because they are better organized in the essence of their educational system (combination of theory and practice) which is a good precondition for the development of competencies among students. So workforce is highly qualified, and up to date with the latest technological changes.

From this research I can conclude that the individual is very motivated to learn and to participate actively in the process of innovation in the organization. Same organizations need to raise awareness that knowledge is the greatest capital which individual may possesses. Therefore, it is necessary to have a good strategy that represents a pattern or plan of integrating the main objectives of the organization, policies and activities into one cohesive whole.

Key institutions of technological clusters are universities and research institutions, because relevant knowledge is created there. Castells and Hall (1994) identified three functions of university in a development of technological clusters. First and the most important one is to create new knowledge, both basic and applied. Secondly, universities train workforce of scientists, engineers and technicians, which are the key ingredient for the development of new technologies. Thirdly, universities may have a direct entrepreneurial role, by supporting a

spin-off research within local companies' networks. An example of the establishment of entrepreneurship in the sophisticated knowledgeable environment is an establishment of industrial parks or incubators in liaison with universities (Audrech et al 2006).

During my research I noticed that we need more information for motivation in knowledge management, how Slovenian companies effectively use knowledge. Are we aware enough about tacit knowledge in the process of innovation? How much are scientist protected (in terms of intellectual property) in process of innovation and lunching innovation patent on the market? Whether the state supports enough innovation projects in Slovenia? Is it Slovenian educational system open enough for a new technological era, in terms of supporting creativity and diversity?

Connectivity among various companies with universities and other educational institutions is the basis for the economic development of a region. In any case, well planned projects with a clear objective and correct strategies of keeping the innovation process, the process of growth and development, as well as product sales can be competitive in this society that is driven by the development of science and technology.

The openness and desire for learning and improving make a man more responsible for governance of a society in which he/she lives and works.

## 8. Vpliv zunanjega znanja na koncept odprte inovacije v Sloveniji in Nemčiji

### Uvod

Področji, ki ju bomo v tem magistrskem delu obravnavali, sta inovativnost organizacije in vpliv znanja na inovativnost.

Osnova inovacije je znanje. Inovacija je definirana kot uporaba znanja (Trott 2012, 17). Izhajamo iz trditve Nonaka (2007), ki pravi, da je v gospodarstvu, v katerem je edina mogoča zadeva negotovost, znanje edini zagotovljen vir, ki nam preostane. Ker se tržišča menjujejo, tehnologija raste, konkurenca povečuje in izdelki starajo, so uspešna podjetja tista, ki nenehno ustvarjajo novo znanje, ga razširjajo v organizaciji in hitro udejanjajo v novih tehnologijah in izdelkih (Nonaka 2007, 2).

Prvi, ki je odkril pomembnost in povezanost med gospodarsko rastjo in novimi izdelki, je bil avstrijski ekonomist Schumpeter (1932, 1939, 1942), izumitelj prve teorije o inovaciji. Schumpetrova ideja je, da je inovacija "ustvarjalno uničenje", val, ki restrukturira celotno tržišče v korist tistih, ki prvi izkoristijo nepovezanost (Trott 2012, 7).

Poudariti je treba vlogo znanosti in tehnologije pri procesu uveljavljanja inovacij, pri čemer je zelo pomembno znanje. Ko Lefever (1992) definira odnos med znanostjo in tehnologijo, trdi, da tehnologijo pogosto dojemamo kot uporabo znanosti, medtem ko je znanost sistematično in formulirano znanje.

### 1.1 Cilj magistrskega dela

Tema magistrske naloge je ugotoviti, kako zunanje znanje vpliva na odprte inovacije v organizacijah v Sloveniji in Nemčiji. Najprej želimo določiti, kaj je zunanje znanje, nato se bomo lotili kriterijev za definiranje pojmov, kaj je inovacija in kako se uporablja znanje, ki bo pripeljalo do inovacije in uspešne realizacije v vseh fazah njegovega razvoja. Potem bomo pojasnili, kako velik je kapital znanja, ki ga posameznik obvlada, in kako se uporablja v organizaciji in širše; kako organizacije sodelujejo in delijo svoje znanje med seboj na regionalni ravni in globalno.

***Iz te ideje izhaja tudi naše raziskovalno vprašanje, ki se glasi: Kolikšna je sposobnost posameznika za prevzem iniciative pri vzpostavitvi strokovnih stikov s strokovnjaki zunaj organizacije?***

Za vzpostavitev čim boljših strokovnih stikov s strokovnjaki zunaj organizacije je treba vzpostaviti timski slog dela, ki dobro deluje. To je namreč prednost, ki omogoča ljudem, ki imajo odločilno vlogo pri svojem delu, da se lahko posvetujejo s svojimi kolegi, da bi se kar najbolj pravilno odločili. V takih organizacijah je sodelovalno vzdušje zelo visoka vrednota, druge prednosti timskega dela pa so izziv, atmosfera, dobri sodelavci, samostojnost in učenje (Wulff 2007, 77).

Uporabili bomo podatke, ki smo jih pridobili z vprašalnikoma REFLEX in HEGESCO.

Mednarodno raziskavo Reflex (Research into Emplyoment and Profesional Flexybility), ki je bila opravljena leta 2007 v sodelovanju naslednjih držav: Avstrija, Belgija, Češka, Estonija, Finska, Francija, Italija, Nizozemska, Norveška, Portugalska, Španija, Švica in Velika Britanija, uporabljamo zato, da bi dobili podatke o Nemčiji. V raziskavo HEGESCO (Higher Education as Generator of Strategic Competences) so vključene naslednje države: Litva,

Poljska, Madžarska, Slovenija in Turčija. Vzorec raziskave REFLEX obsega 70.000 diplomantov iz navedenih držav, ki so diplomirali v študijskem letu 1999/2000.

Eden izmed ciljev, ki smo si jih postavili v nalogi, je zbrati dokaze in utemeljiti, kako se znanje, inovacije, okolje, cene in konkurenca uporabljajo in upravljajo v različnih okoljih. Nemčijo v nalogi primerjalno preučujemo zato, ker je ta država največji gospodarski partner Slovenije. Gospodarske vezi Slovenije in Nemčije imajo dolgo zgodovino, so močne in obstaja možnost, da se širijo in krepijo. Dejstvo, da je Nemčija na področju inovacij vodilna država v Evropi in ker ima precejšnje investicijske naložbe v Sloveniji, pozitivno vpliva na slovensko gospodarstvo in tako spada Slovenija glede inovacijskega razvoja v kategorijo držav, ki sledijo inovacijam (Innovation Union Scoreboard 2013, 50).

### 1.2 Metodologija dela

Ključni vir informacij teoretičnega dela predstavljajo znanstveno-strokovna literatura in različne raziskave. Pri obravnavi teorije smo uporabili več metodoloških pristopov: z *metodo klasifikacije* smo določili splošne pojme, ki se pojavljajo v hipotezah. Z *metodo deskripcije* smo opisali različna dejstva in spoznanja, ki so nastala na podlagi preteklih izkušenj drugih avtorjev. Z *metodo analize* smo preučevali vsak pojem zase v odnosu do drugega pojma (znanje, inovativnost, kompetence).

## 2 ZNANJE IN TIPI ZNANJA

Znanje je nekaj, kar se vsak dan uporablja v vsaki organizaciji in je dokaj kompleksno. Blackler (1995) meni, da je znanje vsajeno v možganih (embrained), kar pomeni, da je najmanjše delno znanje locirano v kognitnivnih in perceptivnih sposobnostih človeških bitij. Znanje je utelešeno (embodied), kaže se na telesen, čutno zaznaven način, je vgrajeno (embedded), obstaja v sistematičnih rutinah, pridobljenih z vplivom lokalnih kultur in je vsajeno v kulturo (encultured), šifrirano (encoded), posredovano z znaki in simboli. Wagner in Snyder (2000, 140) dodajata, da se uporaba znanja nanaša predvsem na komunikacijo: znanje je stvar predstavitve kompetenc, opredeljenih v družbenih skupnostih.

Da bi si pomagali k boljšemu razumevanju obravnavane teme, bomo uporabljali tipologijo znanja po Polanyju (1967), ki je znanje razdelil na tiho in eksplicitno. Tiho znanje je osebno, specifično v kontekstu in ga je težko izkazati (artikulirati). Eksplicitno in implicitno ali kodificirano znanje odraža (reflektira) znanje, ki se lahko prevede v formalni sistematski jezik. Tiho znanje je sestavljeno iz izkušenj, čustev, pripomb, intuicije itd. V tem se razlikuje

od eksplicitnega znanja, ki ga lahko izrazimo z besedami in številkami, posredujemo skupini in lahko ostane last organizacije. Choo (2005, 11) trdi, da organizacijske inovacije izvirajo iz tihega znanja: to znanje obstaja na skupinski in organizacijski ravni. Tiho znanje doseže cilj, ko se prelevi v nove možnosti, izdelke in storitve. Inovacije se realizirajo, ko implicitno znanje pride na površje in se pretvori v predmete ali sisteme. Tiho znanje dobi novo vrednost, ko postane eksplicitno (Choo, 1998).

Trije načini, ki jih podjetja uporabljajo za pretvorbo tihega znanja v eksplicitno, so: prvič: povezovanje kontradiktornih dejstev in idej prek metafor; razrešitev tistih protislovij s sklepi po analogiji in izoblikovanje konceptov ter njihove povezave v model, ki omogoča, da je znanje dostopno tudi drugim v organizaciji (Nonaka in Takeuchi 1995, 35).

### 2.1 Iskanje eksternega znanja

Učinek zunanjega znanja na uvedbo tehnoloških inovacij je lahko zelo različen, je pa odvisen od vira in metode zunanjega znanja. Identificirali smo tri različna porekla zunanjega znanja: prenos informacij prek neformalne mreže, R in D (research and development, ali raziskovanje in razvoj), sodelovanje in tehnološko pridobivanje znanja.

*Znanost se definira kot sistematično in formulirano znanje.* Obstajajo pomembne razlike med znanostjo in tehnologijo. Ena izmed definicij se glasi: *tehnologija je znanje, uporabljeno na izdelkih in proizvajalnem procesu* (Trott 2012, 19). Znanje je vgrajeno v tehnologijo in veščine.

Iskanje znanja ne temelji le na tehnologijah, temveč tudi na geografskem "raziskovanju" (Almeida, Phene in Grant 2006, 359). Študije o inovacijah in razširjanju znanja in tehnologij so ugotovile, da obstaja geografska lokalizacija znanja. Ključni vzrok je, da znanje ostane na določenem geografskem območju, kjer se vzpostavljajo zveze in se znanje izmenjuje med podjetji v regiji. Te zveze so lahko formalne v obliki združenj ali neformalne, kot so regionalne socialne mreže ali mobilnost inženirjev. Slogan" industrijski district" ali Porterjev "industrijski klaster" iz leta 1998, ki ga je vpeljal Alfred Maršal v dvajsetih letih prejšnjega stoletja, pomeni, da se industrijsko specifično znanje razvija na geografsko koncentriranih lokacijah. Ta fenomen ni realen le v tradicionalnih letalskih industrijah, ampak tudi v visokotehnološki industriji, kar vodi k velikemu transferju znanja med podjetji, zahvaljujoč

podobnostim njihovega osnovnega znanja in nadaljevanju zvez, ki se razvijajo v regiji (Almeida in dr. 2006, 362).

Nastanek klastrov je odvisen od okoliščin, kot so lokalizacija, sprožilec ali sprožilni (izzivalni) dogodek, ki spremeni lokacijo v novo proizvajalno točko, in to sproži razvoj klastra, razpoložljivost surovin, specifična znanja in organizacijo R in D, znanja, pridobljena na podlagi izkušenj, specifične ali sofisticirane potrebe določene skupine geografsko koncentriranih kupcev ali podjetij (European Commision, 2002, 14).

Ključne institucije tehnoloških klastrov so univerze in raziskovalne institucije, ker v njih nastaja znanje. Castells in Hall (1994) sta identificirala tri funkcije univerz v razvoju tehničnih klastrov. Prva in najpomembnejša vloga je proizvajati novo znanje, po eni strani osnovno, po drugi uporabno. Drugo vlogo imajo univerze, ki izobražujejo delovno silo znanstvenikov, inženirjev in tehnikov in so najpomembnejše za razvoj novih tehnologij. Tretjo vlogo opravljajo univerze, ki imajo lahko direktno podjetniško vlogo z dodatno (stransko) dejavnostjo raziskav v lokalnem omrežju podjetij. Univerze ustanavljajo ali inkubatorje ali industrijske parke, kar je primer podjetništva in ustanavljanja podjetij, v katerih je veliko znanja.

V sodelovanju vlade in industrije univerze oblikujejo in podpirajo razvoj podjetij, rezultat pa je samovzdrževalna dinamika, v kateri se industrijski igralci vse bolj izkazujejo pri oblikovanju novih podjetij (Malecki 2011, 319).

### 2.2 Transfer zunanjega znanja

Obstaja več načinov, kako se predstavlja znanje v podjetju. Tradicionalno znanje je“ umeščeno“ v poročilih, navodilih, pomnilnikih. Toda kako se to znanje posreduje? Lahko se posreduje neformalno, recimo prek anekdot ali diagramov, bistveno je, da obe strani dojameta novo informacijo, ki sta jo dobili. Prav tako obstajajo različni načini, kako se znanje uporablja. To pomeni, da mora biti razpoložljivo znanje v podjetju dostopno iz različnih virov in da se uporablja na pravem mestu ob pravem času. Transfer znanja je odvisen od možnosti posredovanja, interpretiranja in absorbiranja (DiGuardo, Galvagno 2005, 183).

### 2.3 Integracija zunanjega znanja

Kakšen tip znanja se integrira v inovaciji? Lahko se integrira eksplicitno znanje, ki je formalno, in sistematično, lahko za komunikacijo, za delitev in uporabo v računalniškem programu (Nonaka 1991, 13). Tisto, ki ima drugo dimenzijo – zavedamo pa se, da obstaja – je

“tiho“ znanje. To je precej osebno znanje, ki se težko formalizira, kar pomeni, da je z njim težko komunicirati z drugimi (Nonaka, 1991). Zahodni svet poudarja zunanje (eksplicitno) znanje, medtem ko Japonci dajejo prednost tihemu znanju. Obe vrsti znanja – tiho in zunanje – nista povsem ločeni, temveč sta komplementarni (Nonaka, Takeuchi 1995, 61).

Znanje je izoblikovano in razširjeno prek socialne interakcije med tihim in eksplicitnim znanjem (Nonaka in Takeuchi 1995, 61). Tako interakcijo imenujejo “pretvorba znanja“ (ang. knowledge conversation). Poudariti je treba, da je taka pretvorba “socialni“ proces med posamezniki in ni omejena na posameznika (Nonaka 1991, 15).

### 2.4 Skupnosti praks (CoP)

Za termin “community of practice“ (CoP), ki sta ga v strokovno izrazje vpeljala Lave in Wagner (1991, 98), je značilen *sistem razmerij med ljudmi*, *aktivnosti in* “*sveta*“, *ki se s časom razvijajo in sovpadajo s proizvodnimi praksami ostalih perifernihi skupin.* Druge definicije samo nadgrajujejo že obstoječo, eno izmed njih je vpeljal Hara (2009, 118), ki pravi, da so CoP sodelujoča neformalna omrežja, ki podpirajo strokovne praktike in njihova prizadevanja za razvoj in medsebojno delitev skupnih dojemanj in njihovo angažiranje za izvajanje del – so pomembni dejavniki za pridobitev znanja. Corriera, Paulos in Mesquita (2012, 12) CoP dojemajo kot samoorganizirano skupino ljudi, ki je motivirana s skupnimi interesi, nanaša se pa na dnevno prakso; ta skupina je samoorganizirana, njen cilj je razvoj znanja in večji učinek dela prek interakcije med njenimi člani. Termin skupnost izpostavlja osebne osnove, na podlagi katerih se gradijo zveze med zaposlenimi. CoP se opredeljuje kot članstvo, ki ima po naravi fluiden položaj in je samoorganizirano (Gamble in Blackwell 2001, 80).

### 2.5 Urjenje in razvoj ključnih kompetenc

Osebne kompetence opisujejo pripravljenost in sposobnost posameznika, da pojmuje, analizira in ocenjuje razvojne priložnosti, zahteve in omejitve v družini, službi in javnem življenju, da razvija lastne veščine in odloča o razvoju življenjskih načrtov. V teh kompetencah so zajete značajske lastnosti, in sicer neodvisnost, kritično presojanje, samozavest, zanesljivost, odgovornost in zavest o dolžnosti ter strokovne in etične vrednote. S tem so vključene kognitivne in socialne kompetence. Pravzaprav so osebne kompetence (self-competence) sposobnost posameznika, da deluje moralno samodoločujoče humano, sestavna dela teh sposobnosti pa sta pozitivna samoocena in moralna presoja (Winterton 2006, 53).

## 3 INOVACIJA in koncept odprte inovacije

Schumpeter je prvi napovedal povezanost med inovacijo in gospodarsko rastjo (Trott 2012, 6). Njegova definicija se glasi: inovacija je zelo širok pojem, ki zajema uvajanje novih izdelkov oziroma kakovostno spremembo že obstoječega izdelka, nastanek novega procesa predelave, odpiranje novih tržišč, razvoj novih virov surovin in drugih sestavnih prvin in uvajanje organizacijskih sprememb (Schumpeter 1939, 84). Schumpeter (1939, 85) meni, da nepopolna konkurenca ni zavirajoč dejavnik gospodarskega razvoja, temveč, nasprotno, stimulira razvoj. Ker je podjetnik ključen dejavnik gospodarskega razvoja po Schumpetru, njegova vloga ni inoviranje (ni izumitelj), temveč izume realizira oziroma uvaja in jih s tem spremeni v inovacije (Schumpeter 1939, 86).

In kaj motivira podjetnika, da gre skozi celoten proces uvajanja inovacije (premagovanje ovir, ki obstajajo v tradicionalnem okolju)? Po Schumpetru je gonilna sila dobiček (1939, 85), od njega se pričakuje, da bo podjetniku zagotovil monopolni položaj in zaslužek v času trajanja monopola.

Po Damanpouru (1991, 556) lahko inovacijo opredelimo kot nov izdelek ali storitev, novo tehnologijo proizvajalnega procesa, novo strukturo in nov administrativni sistem, vključimo tudi nov načrt ali program.

V odprtih modelih inovacij poteka menjava znanja obojestransko, z notranjo uporabo zunanjega znanja (ang. inbound open innovation) in zunanje uporabe notranjega znanja (ang. outbound open innovation), ki se kaže v raziskavah, zadrževanju in izkoriščanju znanja, ki se lahko vzdržuje v mejah podjetja ali zunaj njih (Lichtenhaler in Lichtenhaler 2009).

V zaprtem modelu inovacij obstaja odpor proti idejam in znanju, ki prihajajo iz okolja podjetja. Ta sindrom se imenuje “ni izumljeno tukaj“ (not invented here), medtem ko je pri modelu odprte inovacije odnos nasproten. Je pozitiven in se reče “ponosno izumljeno na drugem mestu“ (ang. proudly find elswhere). Podjetja z odprtim modelom inovacije uporabljajo zunanje vire, ki so zaradi večje specializiranosti hitrejši, cenejši in učinkovitejši v primerjavi z uporabo izključno notranjega razvoja, ki po navadi zahteva veliko več časa, preden se pojavijo vidni rezultati (Chesbrough 2003, 49).

### 3.1 Povezovanje med podjetji (mreženje)

Pridružitev podjetja v mrežo je postala normalna zadeva v zadnjih tridesetih letih. Mreže spodbujajo usklajevanje, ki izboljšuje zmogljivosti vsake družbe in pripelje do tega, da se podjetja ne izolirajo drugo od drugega in lahko ponujajo prednosti specializacije in raznolikost generacij (lastnosti, značilnosti raznolikega) (Kogut 2000). Odgovor na vprašanje, zakaj podjetja sodelujejo v omrežjih, je, da podjetjem omrežja pomagajo razvijati in absorbirati tehnologije, naučijo novih spretnosti in ohranijo dostop do potrebnih sredstev. Pomagajo jim, da se lažje odzovejo/prenesejo šoke v poslovnem okolju, da izboljšujejo možnosti za preživetje in finančno uspešnost. Vsa podjetja niso dovolj privlačna za sprejem v omrežja, nekatera pa so upravičeni člani omrežja (Cooke 2011, 223). Najosnovnejši razvrstitvi po tipu mreženja sta – odprto in zaprto. Omrežja se bistveno razlikujejo po stopnji sodelovanja in odprtosti za vse tiste, ki se želijo pridružiti in se včlaniti. V skupino, ki je organizirana po principu popolnega odprtega sodelovanja ali crowdsourcing, spadajo dobavitelji, kupci, projektanti, raziskovalne institucije, izumitelji, študenti, sodelujejo pa lahko tudi konkurenti (Pisano, Verganti 2008, 3). V odprtem omrežju po navadi iščejo podporo tistih, ki bi rešili njihove probleme. Taki projekti so Mozilla, Linux, Apache. V nasprotju s tem so zaprta omrežja kot zasebni klubi.

### 3.2 Poslovna strategija

Inovacijski proces je del strategije doseganja postavljenih ciljev, ki mora biti v skladu z vizijo in poslanstvom podjetja. Med številnimi poslovnimi strategijami je za naše delo pomembna inovacijska strategija, ki se pojavlja v različnih oblikah. Tidd, Bessant in Pavitt (2001, 6) menijo, da inovacije prinašajo koristi za podjetja glede na obliko njihove inovativnosti. Zato obstajajo novice kot oblika inovacije, vključujejo ponudbo unikatnih izdelkov ali storitev kot strateško prednost podjetja. Obstajajo še druge vrste inovacij radikalnih izdelkov oziroma tehnologij, posledice katerih so spremembe pravil poslovanja v industriji, in to je strateška prednost.

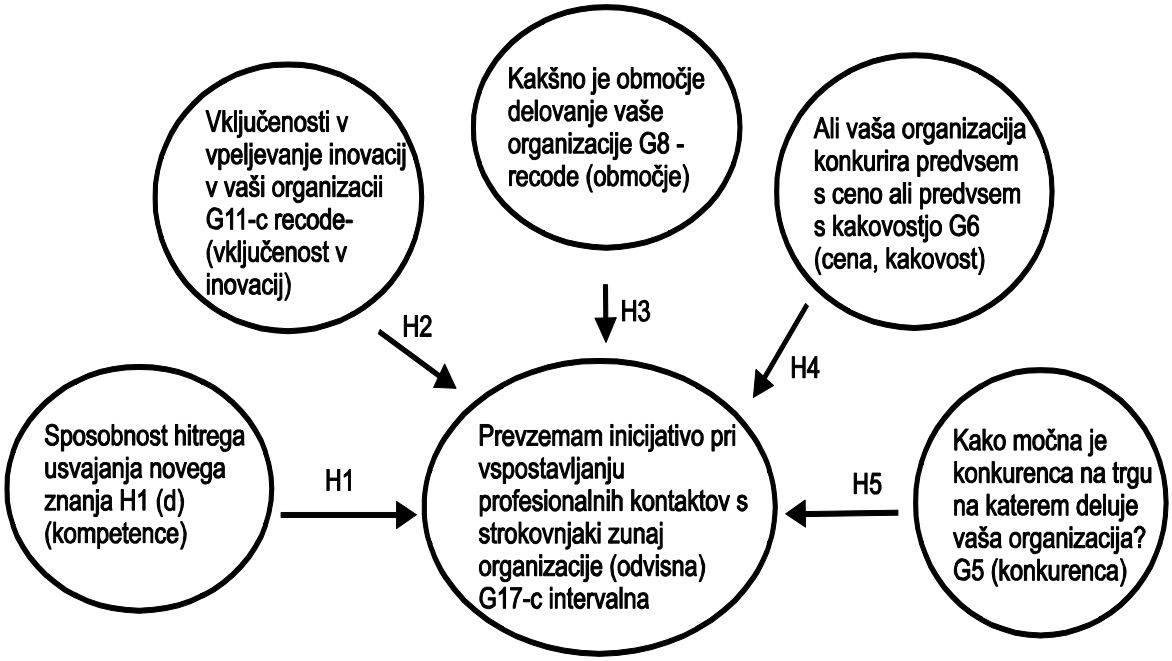
Za naše magistrsko delo je pomembno pojasniti, kaj pomeni koopeticija in kako se razvija ta strategija. Koopeticijo lahko opišemo kot stanje, v katerem sodelovanje in konkurenca sobivata v enakem razmerju. Dejstvo je, da lahko ta vrsta "sožitja" poteka v okviru medinstitucionalnih oddelkov podjetja in v številnih kontekstih v organizacijah, kot so: medosebne, interskupinske komunikacije v eni sami enoti ali v službi. V obstoječi literaturi se izraz *koopeticija* uporablja za spodbujanje odnosov med strankami in njihovimi poslovnimi

izidi in inovacijami, predvsem kot posledica izmenjave znanja, pridobljenega od učinkov učenja v enotah podjetja (Luo et al 2006). Po Teece (1998) nastajajo inovacije prek dveh ločenih in vzajemno povezanih procesov: prvi dodaja kaos in več znanja in idej, drugi pa zmanjšuje kaos tako, da združuje obstoječe ideje in znanje v nove inovacije. Ti procesi so povezani s koopeticijo na način, na katerega so procesi ustvarjanja znanja povezani s sodelovanjem in uporabo znanja in vsi skupaj so povezani s konkurenco. V procesu inovacij se ti postopki nadomeščajo in sobivajo, toda pridobivanje novega znanja vedno temelji na že obstoječem znanju ali z internalizacijo (Rita, Valimaki 2013, 66). Strategija koopeticije daje podlago za celovito integracijo teorije tekmovanja in teorije sodelovanja za ustvarjanje boljšega razumevanja in trajnostnega poslovanja. Koopetitivni sistem za ustvarjanje vrednosti pravi, da so raziskovalci in menedžerji občutljivi za strateške pojave, kot so iskalniki za konkurenčno prednost in sodelovanje, kjer so istočasno konkurenti in sodelavci.

## 4 Empirični del

Na spodnji sliki lahko vidimo shematični prikaz neodvisnih spremenljivk v primerjavi z odvisno spremenljivko iz vprašalnika projektov Hegesco za Slovenijo in Reflex za Nemčijo.

**Figure 8.1: Regresija s spremenljivkami**




Iz izbranih spremenljivk smo definirali 5 hipotez, od katerih sta prvi dve opredeljeni na ravni posameznika, druge tri pa se nanašajo na raven organizacije.

**Prva hipoteza (H1): Če si posameznik bolj prizadeva za pridobitev novega znanja, prevzema večjo iniciativo pri vzpostavljanju profesionalnih kontaktov zunaj organizacije.**

Kot primer pridobivanja novega znanja je izpopolnjevanje, na primer različni tečaji, seminarji, izmenjava znanj in izkušenj v okviru različnih oddelkov v podjetju. Izhajamo iz hipoteze, da je posameznik ob sprejetju novega znanja bolj motiviran, da vzpostavi strokovne stike zunaj organizacije, da bi prišel do novega znanja. V organizacijah obstajajo skupnosti, ki so po naravi spremenljive in samoorganizirane, oblikovane na osebni ravni in vzpostavljajo povezavo med delavci (Gamble 2001, 80). Take skupnosti Gamble v praksi opredeli skupnost posameznikov z omejenimi neformalnimi medsebojnimi razmerji (veže jih fluidna sila nove ideje), ki imajo podobne vloge v poslovnem in skupnem okviru.

**Druga hipoteza (H2): Če je posameznik bolj vključen v vpeljevanje inovacij, prevzema večjo iniciativo pri vzpostavljanju profesionalnih kontaktov zunaj organizacije.**

Tukaj je nekaj primerov ključnih vlog, ki jih imajo posamezniki v inovacijskem procesu: tehnični inovator – proizvaja nove ideje in si ogleduje nove in drugačne načine za proizvodnjo, strokovnjak za eno ali več področij, ki je običajno imenovan "nori znanstvenik". Tehnični – komercialni skener zahteva enormno veliko informacij zunaj organizacije, pogosto prek omrežja. To vključuje trg in tehnične informacije. Posreduje informacije drugim, uporablja se kot vir informacij drugim v organizaciji (Trott 2011, 103).

**Tretja hipoteza (H3): Če organizacija deluje bolj lokalno, bodo posamezniki bolj prevzemali iniciativo pri vzpostavljanju profesionalnih kontaktov zunaj organizacije.**

Geografska, kulturna in institucionalna bližina omogoča podjetjem tesnejše odnose, boljše informacije, močne spodbude in druge izzive, ki jih je težko ustvariti na daljavo. Konkurenčna prednost je bolj v lokalnih zadevah, kot so znanje, odnosi in motivacijo, da jih tekmeci na daljavo ne morejo kopirati (Trott 2012, 243).

**Četrta hipoteza (H4): Če organizacija bolj konkurira s kakovostjo, ne pa s ceno, so posamezniki uspešnejši pri prevzemanju iniciative za vzpostavljanje profesionalnih kontaktov zunaj organizacije.**

Obstajajo razlike pri načinu izvajanja inovacij in dajanju izdelka na trgu. V Evropi so na primer države z dolgo zgodovino v razvoju znanstvenih izumov, toda trpijo zaradi slabega

razumevanja trga in pogosto nimajo koristi od celotnega potenciala, ki prihaja iz njihovih izumov. Ameriška podjetja zaslužijo veliko na trgu, toda ne izboljšujejo kakovosti in ne znižujejo cene, medtem ko imajo japonske in azijske družbe obsežne zmogljivosti na področju kakovosti in učinkovitosti proizvodnje (Trott 2012, 238).

**Peta hipoteza (H5). Če ima organizacija več konkurence, bodo posamezniki bolj iniciativni pri vzpostavljanju profesionalnih kontaktov zunaj organizacije.**

Konkurenca in sodelovanje igrata različne vloge pri procesu ustvarjanja znanja. Prvič, sodelovanje se uporablja za izboljšanje izmenjave znanja, nato pa se uporablja konkurenca, da vpelje (obdelajo) nekaj tekmovalnih konkurenčnih inačic, in na koncu se s konstruktivnim soočenjem in sodelovanjem uporabijo za pripravo odličnega koncepta (Rita, Valimaki 2013, 67). Čim več je sodelovanja in izmenjav, več je idej, več konkurence med njimi, to je začetek sobivanja, ki se med sodelovanjem in konkurenco imenuje koopeticija (Rita et al 2013, 69).

### 4.1 Rezultati za Slovenijo in Nemčijo

Pri raziskovanju vpliva izbranih petih neodvisnih spremenljivk na spremenljivko "prevzemam iniciativo" v Sloveniji in Nemčiji se je izkazalo, da podjetja v Nemčiji prevzemajo iniciativo drugače kot podjetja v Sloveniji. Rezultati kažejo, da na opazovano odvisno spremenljivko v Sloveniji vpliva bistveno več neodvisnih spremenljivk kot v Nemčiji (glej tabelo 5.4 na strani 100). Pri tem ugotavljamo, da na" prevzemanje iniciative" v Sloveniji statistično značilno (sig < 5%) vplivajo 4 izbrane neodvisne spremenljivke, in sicer: hitro osvajanje novega znanja, vključevanje v inovacije, območje in cena/kakovost. Pri Nemčiji se je izkazalo (glej tabelo: 5.8 na strani 104), da na "prevzemanje iniciative" statistično značilno vplivata samo dve, to sta hitro osvajanje novega znanja in vključevanje v inovacije. Če rezultate prenesemo na dejansko poslovno okolje, lahko rečemo, da so smiselni, saj je logično, da zaradi majhnosti Slovenije "območje" toliko bolj vpliva na prevzemanje iniciative kot v Nemčiji, ki je ozemeljsko veliko večja. Podobno bi lahko rekli tudi za ceno/kakovost, saj ima Slovenija bruto domači proizvod na prebivalca skoraj za polovico manjši.

S pridobljenimi rezultati lahko potrdimo svojo prvo hipotezo za Slovenijo in Nemčijo, če namreč posameznik pridobiva več novega znanja, bolje deluje pri snovanju strokovnih stikov zunaj organizacije. Poleg tega lahko na osnovi rezultatov potrdim drugo hipotezo za Slovenijo in Nemčijo, ki navaja, da je posameznik, ki je bolj vključen v inovacije, bolj spodbujen za snovanje strokovnih stikov  zunaj organizacije. Rezultati za Slovenijo potrjujejo tudi tretjo

hipotezo, ki navaja, da v organizacijah, ki delujejo lokalno, posamezniki težijo k snovanju poklicnih stikov zunaj organizacije. Tudi četrta hipoteza je potrjena za Slovenijo, saj konkurenca na podlagi kakovosti vpliva na pobudo za vzpostavitev strokovnih stikov zunaj organizacije. Ker intenzivnost konkurence ne vpliva na odvisno variablo "prevzemam iniciativo", je hipoteza št. 5 zavrnjena za Slovenijo in za Nemčijo. S pridobljenimi rezultati zavračam tretjo, četrto in peto hipotezo za Nemčijo.

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# APPENDIX

## APPENDIX A: RESULTS for SLOVENIA

Hegesco study Slovenia

**Table A.1: Share of graduates from Slovenia in research Hegesco**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Slovenia | 2923 | 100,0 | 100,0 | 100,0 |

## Distribution frequency

**Table A.2: Distribution of frequency for variable Fast learning (H1-d)**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Very low | 1 | ,0 | ,0 | ,0 |
| | 2,00 | 3 | ,1 | ,1 | ,1 |
| | 3,00 | 51 | 1,7 | 1,8 | 2,0 |
| | 4,00 | 247 | 8,5 | 8,8 | 10,7 |
| | 5,00 | 668 | 22,9 | 23,8 | 34,5 |
| | 6,00 | 1058 | 36,2 | 37,6 | 72,1 |
| | Very high | 784 | 26,8 | 27,9 | 100,0 |
| | Total | 2812 | 96,2 | 100,0 | |
| Missing | System | 111 | 3,8 | | |
| **Total** | | **2923** | **100,0** | | |

**Table A.3: Distribution of frequency for variable involvement in innovation (G11-c)**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | yes | 1807 | 61,8 | 78,8 | 78,8 |
| | no | 486 | 16,6 | 21,2 | 100,0 |
| | Total | 2293 | 78,4 | 100,0 | |
| Missing | System | 630 | 21,6 | | |
| **Total** | | **2923** | **100,0** | | |

**Table A.4: Distribution of frequency for the variable area (G8)**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | local | 1731 | 59,2 | 63,4 | 63,4 |
| | international | 999 | 34,2 | 36,6 | 100,0 |
| | Total | 2730 | 93,4 | 100,0 | |
| Missing | System | 193 | 6,6 | | |
| **Total** | | **2923** | **100,0** | | |

**Table A.5: Distribution of frequency for the variable area (G8)**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Primarily with the price | 55 | 1,9 | 3,1 | 3,1 |
| | 2,00 | 83 | 2,8 | 4,6 | 7,7 |
| | 3,00 | 509 | 17,4 | 28,4 | 36,1 |
| | 4,00 | 545 | 18,6 | 30,4 | 66,5 |
| | Primarily with the quality | 601 | 20,6 | 33,5 | 100,0 |
| | Total | 1793 | 61,3 | 100,0 | |
| Missing | System | 1130 | 38,7 | | |
| **Total** | | **2923** | **100,0** | | |

**Table A.6: Distribution of frequency for variable competition (G5)**

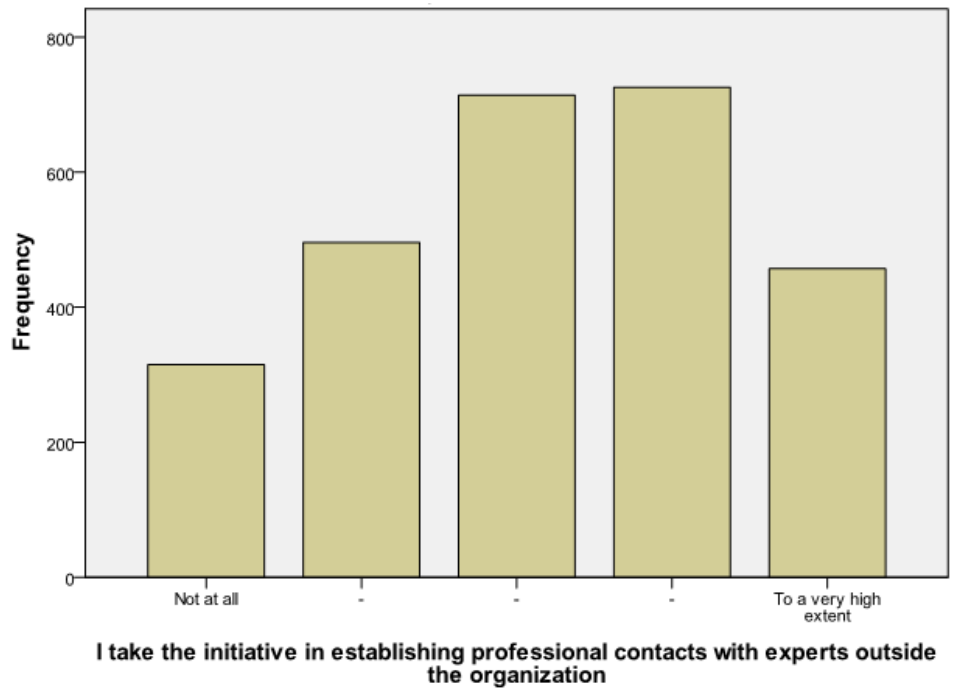
| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Very low | 175 | 6,0 | 8,3 | 8,3 |
| | 2,00 | 203 | 6,9 | 9,6 | 18,0 |
| | 3,00 | 402 | 13,8 | 19,1 | 37,1 |
| | 4,00 | 592 | 20,3 | 28,1 | 65,2 |
| | Very high | 733 | 25,1 | 34,8 | 100,0 |
| | Total | 2105 | 72,0 | 100,0 | |
| Missing | System | 818 | 28,0 | | |
| **Total** | | **2923** | **100,0** | | |

**Table A.7: Distribution of frequency for variable Taking initiative (G17-c)**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Not at all | 315 | 10,8 | 11,6 | 11,6 |
| | 2,00 | 496 | 17,0 | 18,3 | 29,9 |
| | 3,00 | 714 | 24,4 | 26,4 | 56,3 |
| | 4,00 | 726 | 24,8 | 26,8 | 83,1 |
| | In very high extent | 457 | 15,6 | 16,9 | 100,0 |
| | Total | 2708 | 92,6 | 100,0 | |
| Missing | System | 215 | 7,4 | | |
| **Total** | | **2923** | **100,0** | | |

## Bar Chart

**Graph A.1: Bar Chart for taking initiative in establishing professional contacts**



## BIVARIATE ANALYSIS

## CORELATION /CROSSTABS AND Chi – SQUARE

## Crosstabs (correlation)

**Table A.8: Number of valid cases between the G-17 c and H1d**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | **Total** | |
| | N | Percent | N | Percent | N | Percent |
| Taking the initiative * quickly acquire new knowledge | 2615 | 89,5% | 308 | 10,5% | **2923** | **100,0%** |

**Table A.9: Correlation between the G17-c and H1d**

| | | Quickly acquire a new knowledge | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 Very low | 2 - | 3 - | 4 - | 5 - | 6 - | 7 Very high | **Total** |
| Taking the initiative | 1 Not at all | 0 | 1 | 15 | 39 | 79 | 103 | 66 | **303** |
| | 2 - | 0 | 2 | 11 | 56 | 143 | 164 | 106 | **482** |
| | 3 - | 1 | 0 | 14 | 68 | 174 | 284 | 152 | **693** |
| | 4 - | 0 | 0 | 3 | 49 | 155 | 302 | 192 | **701** |
| | 5 To a very high extent | 0 | 0 | 2 | 17 | 74 | 140 | 203 | **436** |
| **Total** | | **1** | **3** | **45** | **229** | **625** | **993** | **719** | **2615** |

**Table A.10: Pearson's Chi-square between G17-c and H1d**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 171,253(a) | 24 | ,000 |
| Likelihood Ratio | 163,515 | 24 | ,000 |
| Linear-by-Linear Association | 111,151 | 1 | ,000 |
| N of Valid Cases | 2615 | | |

a 10 cells (28.6 %) have expected count less than 5. The minimum expected count is, 12.

**Table A.11: Number of valid cases between G17-c and G11-c**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | **Total** | |
| | *N* | *Percent* | *N* | *Percent* | *N* | *Percent* |
| Taking the initiative* involvement in innovations | 2272 | 77,7% | 651 | 22,3% | **2923** | **100,0%** |

**Table A.12: The correlation between the G17-c and G11-c**

| | | *Involvement in innovations* | | ***Total*** |
|---|---|---|---|---|
| | | *Yes* | *No* | |
| Taking the initiative | Not at all | 145 | 104 | **249** |
| | 2,00 | 297 | 106 | **403** |
| | 3,00 | 476 | 115 | **591** |
| | 4,00 | 511 | 114 | **625** |
| | In very high extent | 366 | 38 | **404** |
| **Total** | | **1795** | **477** | **2272** |

**Table A.13: Pearson's Chi-square between G17-c and G11-c**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 108,031(a) | 4 | ,000 |
| Likelihood Ratio | 104,059 | 4 | ,000 |
| Linear-by-Linear Association | 95,226 | 1 | ,000 |
| N of Valid Cases | 2272 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 52.28.

**Table A.14: Number of valid cases G17- c and G8**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | **Total** | |
| | *N* | *Percent* | *N* | *Percent* | *N* | *Percent* |
| Taking the initiative * area | 2690 | 92,0% | 233 | 8,0% | **2923** | **100,0%** |

**Table A.15: The correlation between G 17-c and G8**

| | | Area | | |
|---|---|---|---|---|
| | | *local* | *international* | ***Total*** |
| Taking the initiative | Not at all | 226 | 86 | **312** |
| | 2,00 | 329 | 163 | **492** |
| | 3,00 | 447 | 262 | **709** |
| | 4,00 | 435 | 288 | **723** |
| | In very high extent | 265 | 189 | **454** |
| **Total** | | **1702** | **988** | **2690** |

**Table A.16: Pearson's chi-square between G17-c and G8**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 21,727(a) | 4 | ,000 |
| Likelihood Ratio | 22,151 | 4 | ,000 |
| Linear-by-Linear Association | 20,704 | 1 | ,000 |
| N of Valid Cases | 2690 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 114.59.

**Table A.17: Number of valid cases between G17c and G6.**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | *Valid* | | *Missing* | | ***Total*** | |
| | N | Percent | N | Percent | *N* | *Percent* |
| Taking the initiative * price/quality | 1766 | 60,4% | 1157 | 39,6% | **2923** | **100,0%** |

**Table A.18: Correlation between G17-c and G6.**

| | | *Price/quality* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Primarily with the price* | *2,00* | *3,00* | *4,00* | *Primarily with the quality* | ***Total*** |
| Taking the initiative | Not at all | 13 | 12 | 60 | 45 | 45 | **175** |
| | 2,00 | 9 | 12 | 92 | 93 | 95 | **301** |
| | 3,00 | 16 | 21 | 135 | 143 | 151 | **466** |
| | 4,00 | 12 | 24 | 136 | 166 | 161 | **499** |
| | In very high extent | 3 | 13 | 79 | 91 | 139 | **325** |
| **Total** | | **53** | **82** | **502** | **538** | **591** | **1766** |

**Table A.19: Pearson's Chi-square between G17-c and G6**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 39,782(a) | 16 | ,001 |
| Likelihood Ratio | 37,612 | 16 | ,002 |
| Linear-by-Linear Association | 24,212 | 1 | ,000 |
| N of Valid Cases | 1766 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 5,25.

**Table A.20: Number of valid cases between G17-c and G5.**

| | *Cases* | | | | | |
|---|---|---|---|---|---|---|
| | *Valid* | | *Missing* | | ***Total*** | |
| | *N* | *Percent* | *N* | *Percent* | *N* | *Percent* |
| Taking the initiative * competition | 2076 | 71,0% | 847 | 29,0% | **2923** | **100,0%** |

**Table A.21: Correlation between variables G17-c and G5**

| | | *Competition* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Very low* | *2,00* | *3,00* | *4,00* | *Very strong* | ***Total*** |
| Taking the initiative | Not at all | 30 | 23 | 46 | 51 | 64 | **214** |
| | 2,00 | 28 | 41 | 73 | 111 | 109 | **362** |
| | 3,00 | 46 | 46 | 98 | 165 | 198 | **553** |
| | 4,00 | 42 | 50 | 115 | 159 | 205 | **571** |
| | In very high extent | 23 | 42 | 65 | 98 | 148 | **376** |
| **Total** | | **169** | **202** | **397** | **584** | **724** | **2076** |

**Table A.22: Pearson's chi-square between G17-c and G5**

| | *Value* | *Df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 27,284(a) | 16 | ,038 |
| Likelihood Ratio | 25,999 | 16 | ,054 |
| Linear-by-Linear Association | 11,519 | 1 | ,001 |
| N of Valid Cases | 2076 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 17.42.

## REFLEX STUDY GERMANY

## APPENDIX B: REZULTS for GERMANY

**Table B.1: Share of graduates from Germany in research Reflex.**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Germany | 1700 | 100,0 | 100,0 | 100,0 |

## The distribution of frequencies of variables

**Table B.2: Distribution of frequency for the variable H1-d**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Very low | 2 | ,1 | ,1 | ,1 |
| | 2,00 | 3 | ,2 | ,2 | ,3 |
| | 3,00 | 26 | 1,5 | 1,6 | 1,9 |
| | 4,00 | 100 | 5,9 | 6,1 | 8,0 |
| | 5,00 | 305 | 17,9 | 18,5 | 26,5 |
| | 6,00 | 709 | 41,7 | 43,0 | 69,5 |
| | Very high | 502 | 29,5 | 30,5 | 100,0 |
| | Total | 1647 | 96,9 | 100,0 | |
| Missing | System | 53 | 3,1 | | |
| **Total** | | **1700** | **100,0** | | |

**Table B.3: Distribution of variable-frequency G11- c**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | yes | 830 | 48,8 | 64,7 | 64,7 |
| | no | 453 | 26,6 | 35,3 | 100,0 |
| | Total | 1283 | 75,5 | 100,0 | |
| Missing | System | 417 | 24,5 | | |
| **Total** | | **1700** | **100,0** | | |

**Table B.4: Distribution of variable-frequency G8**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Local | 969 | 57,0 | 65,9 | 65,9 |
| | International | 502 | 29,5 | 34,1 | 100,0 |
| | Total | 1471 | 86,5 | 100,0 | |
| Missing | System | 229 | 13,5 | | |
| **Total** | | **1700** | **100,0** | | |

**Table B.5: Distribution of variable-frequency G6**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Primarily with the price | 85 | 5,0 | 7,7 | 7,7 |
| | 2,00 | 155 | 9,1 | 14,0 | 21,6 |
| | 3,00 | 251 | 14,8 | 22,6 | 44,2 |
| | 4,00 | 248 | 14,6 | 22,3 | 66,5 |
| | Primarily with the quality | 372 | 21,9 | 33,5 | 100,0 |
| | Total | 1111 | 65,4 | 100,0 | |
| Missing | System | 589 | 34,6 | | |
| **Total** | | **1700** | **100,0** | | |

**Table B.6: Distribution of frequency for variable price / quality G 5**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Very low | 68 | 4,0 | 5,4 | 5,4 |
| | 2,00 | 69 | 4,1 | 5,5 | 11,0 |
| | 3,00 | 204 | 12,0 | 16,3 | 27,3 |
| | 4,00 | 418 | 24,6 | 33,5 | 60,8 |
| | Very strong | 490 | 28,8 | 39,2 | 100,0 |
| | Total | 1249 | 73,5 | 100,0 | |
| Missing | System | 451 | 26,5 | | |
| **Total** | | **1700** | **100,0** | | |

**Table B.7: The distribution variable-frequency G17- c.**

| | | *Frequency* | *Percent* | *Valid Percent* | *Cumulative Percent* |
|---|---|---|---|---|---|
| Valid | Very low | 167 | 9,8 | 11,3 | 11,3 |
| | 2,00 | 301 | 17,7 | 20,3 | 31,6 |
| | 3,00 | 370 | 21,8 | 25,0 | 56,5 |
| | 4,00 | 405 | 23,8 | 27,3 | 83,9 |
| | In very high extent | 239 | 14,1 | 16,1 | 100,0 |
| | Total | 1482 | 87,2 | 100,0 | |
| Missing | System | 218 | 12,8 | | |
| **Total** | | **1700** | **100,0** | | |

## BIVARIATE ANALYSIS

**Table B.8: Number of valid cases G17- c and H1-d.**

| | *Cases* | | | | | |
|---|---|---|---|---|---|---|
| | *Valid* | | *Missing* | | ***Total*** | |
| | *N* | *Percent* | *N* | *Percent* | *N* | *Percent* |
| Taking the initiative * quickly acquire new knowledge | 1464 | 86,1% | 236 | 13,9% | **1700** | **100,0%** |

**Table B.9: The correlation between G17-c and H1- d.**

| | | *Quickly acquire new knowledge* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | *Very low* | *2,00* | *3,00* | *4,00* | *5,00* | *6,00* | *Very high* | ***Total*** |
| Taking the initiative | Not at all | 0 | 1 | 7 | 11 | 34 | 80 | 32 | **165** |
| | 2,00 | 1 | 1 | 6 | 30 | 60 | 120 | 80 | **298** |
| | 3,00 | 0 | 1 | 4 | 29 | 67 | 169 | 95 | **365** |
| | 4,00 | 0 | 0 | 4 | 12 | 74 | 181 | 129 | **400** |
| | In very high extent | 0 | 0 | 3 | 4 | 33 | 84 | 112 | **236** |
| **Total** | | **1** | **3** | **24** | **86** | **268** | **634** | **448** | **1464** |

**Table B.10: Pearson's Chi-square between G17- c and H1-d**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 82,524(a) | 24 | ,000 |
| Likelihood Ratio | 81,269 | 24 | ,000 |
| Linear-by-Linear Association | 49,736 | 1 | ,000 |
| N of Valid Cases | 1464 | | |

a 13 cells (37,1%) have expected count less than 5. The minimum expected count is, 11

**Table B.11: Number of valid cases between G17-c and G11-c**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | **Total** | |
| | *N* | *Percent* | *N* | *Percent* | *N* | *Percent* |
| Taking the initiative* involvement in innovations | 1263 | 74,3% | 437 | 25,7% | **1700** | **100,0%** |

**Table B.12: Correlation between G17-c and G11-c.**

| | | *Involvement in innovations* | | |
|---|---|---|---|---|
| | | *Yes* | *No* | ***Total*** |
| Taking the initiative | Not at all | 57 | 76 | **133** |
| | 2,00 | 130 | 125 | **255** |
| | 3,00 | 210 | 113 | **323** |
| | 4,00 | 256 | 93 | **349** |
| | In very high extent | 163 | 40 | **203** |
| **Total** | | **816** | **447** | **1263** |

**Table B.13: Pearson's Chi-square between G17-c and G11- c**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 81,771(a) | 4 | ,000 |
| Likelihood Ratio | 82,110 | 4 | ,000 |
| Linear-by-Linear Association | 80,073 | 1 | ,000 |
| N of Valid Cases | 1263 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 47,07.

**Table B.14: Number of valid cases between G17-c and G8**

| | Cases | | | | | |
|---|---|---|---|---|---|---|
| | Valid | | Missing | | **Total** | |
| | *N* | *Percent* | *N* | *Percent* | *N* | *Percent* |
| Taking the initiative * area | 1441 | 84,8% | 259 | 15,2% | **1700** | **100,0%** |

**Table B.15: The correlation between G17- c and G8**

| | | *Area* | | |
|---|---|---|---|---|
| | | *Local* | *International* | ***Total*** |
| Taking the initiative | Not at all | 112 | 53 | **165** |
| | 2,00 | 200 | 92 | **292** |
| | 3,00 | 230 | 127 | **357** |
| | 4,00 | 260 | 135 | **395** |
| | In very high extent | 144 | 88 | **232** |
| **Total** | | **946** | **495** | **1441** |

**Table B.16: Pearson's Chi-square between G17-c and G8**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 2,972(a) | 4 | ,563 |
| Likelihood Ratio | 2,969 | 4 | ,563 |
| Linear-by-Linear Association | 1,977 | 1 | ,160 |
| N of Valid Cases | 1441 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 56,68.

**Table B.17: Number of valid cases between G17-c and G6**

| | *Cases* | | | | | |
|---|---|---|---|---|---|---|
| | *Valid* | | *Missing* | | ***Total*** | |
| | N | Percent | N | Percent | N | Percent |
| Taking the initiative * price/quality | 1091 | 64,2% | 609 | 35,8% | **1700** | **100,0%** |

**Table B.18: Correlation between G17-c and G6**

| | | *Price/quality* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Primarily with the price* | *2,00* | *3,00* | *4,00* | *Primarily with the quality* | ***Total*** |
| Taking the initiative | Not at all | 10 | 17 | 26 | 25 | 34 | **112** |
| | 2,00 | 15 | 35 | 52 | 57 | 51 | **210** |
| | 3,00 | 20 | 40 | 64 | 65 | 91 | **280** |
| | 4,00 | 20 | 37 | 61 | 57 | 120 | **295** |
| | In very high extent | 19 | 23 | 45 | 40 | 67 | **194** |
| **Total** | | **84** | **152** | **248** | **244** | **363** | **1091** |

**Table B.19: Pearson's chi-square between G17-c and G6**

| | *Value* | *df* | *Asymp. Sig. (2-sided)* |
|---|---|---|---|
| Pearson Chi-Square | 19,202(a) | 16 | ,258 |
| Likelihood Ratio | 19,246 | 16 | ,256 |
| Linear-by-Linear Association | 3,047 | 1 | ,081 |
| N of Valid Cases | 1091 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 8,62.

**Table B.20: Number of valid cases between G17-c and G5.**

| | *Cases* | | | | | |
|---|---|---|---|---|---|---|
| | *Valid* | | *Missing* | | ***Total*** | |
| | N | Percent | N | Percent | N | Percent |
| Taking the initiative * competition | 1222 | 71,9% | 478 | 28,1% | **1700** | **100,0%** |

**Table B.21: Correlation between G17-c and G5**

| | | *Competition* | | | | | |
|---|---|---|---|---|---|---|---|
| | | *Very low* | *2,00* | *3,00* | *4,00* | *Very strong* | ***Total*** |
| Taking the initiative | Not at all | 7 | 7 | 29 | 38 | 51 | **132** |
| | 2,00 | 12 | 14 | 38 | 80 | 93 | **237** |
| | 3,00 | 20 | 15 | 51 | 111 | 116 | **313** |
| | 4,00 | 19 | 25 | 60 | 110 | 123 | **337** |
| | In very high extent | 9 | 7 | 22 | 71 | 94 | **203** |
| **Total** | | **67** | **68** | **200** | **410** | **477** | **1222** |

**Table B.22: Pearson's chi-square between G17-c and G5**

| | Value | df | Asymp. Sig. (2-sided) |
|---|---|---|---|
| Pearson Chi-Square | 16,927(a) | 16 | ,390 |
| Likelihood Ratio | 17,168 | 16 | ,375 |
| Linear-by-Linear Association | 1,778 | 1 | ,182 |
| N of Valid Cases | 1222 | | |

a 0 cells (,0 %) have expected count less than 5. The minimum expected count is 7.24.